

RESUME FOR:**KEITH ANDREW WILLIAMS**

BORN: 26 February 1972, Georgia U.S.A.
CITIZENSHIP: USA
LANGUAGES: English (native), German (fluent), Dutch (intermediate),
 Russian (intermediate, dormant)
CLEARANCE: Active Secret

OBJECTIVE: I seek roles that best utilize my ability to conceive and coordinate broad, new research and educational initiatives, in environments strongly supportive of creativity and innovation.

BRIEF BOGRAPHY: Born in Georgia, USA in 1972; grew up in the middle east (Jordan) and southern Africa, including Rhodesia (Zimbabwe), Botswana, and South Africa, attending local/native schools throughout. Completed middle school education via correspondence with The Calvert School in Baltimore, Maryland. Returned to the US for three years of high school, which was completed in east-central Kentucky. Completed MS degree in physics at the University of Kentucky in 1999, including a one-year stipendium at the Ruprecht-Karls University in Heidelberg, Germany. Completed a PhD in physics at Penn State University in 2001; graduate work included two research trips to Japan. Thereafter completed a postdoctoral research in the Molecular Biophysics Group at the Delft University of Technology in the Netherlands, before establishing a nanophysics laboratory in the physics department at the University of Virginia. Currently employed as Program Manager and division CTO for the Navy Research and Engineering Division of SAIC, based at the Naval Research Laboratory in Washington DC, while on leave from the University of Virginia.

EDUCATION:

Postdoctoral Researcher	Delft University of Technology	2001-2004
Ph.D. - Physics	Pennsylvania State University	2001
M.S. - Physics	University of Kentucky	1998
Stipendiat	Ruprecht-Karls Universität Heidelberg	1991-92

APPOINTMENTS:

Program Manager and Chief Technology Officer	SAIC Navy Research & Engineering Division	2010-present
*Assistant Professor	University of Virginia, Physics	2004-present
Postdoctoral Researcher	Technische Universiteit Delft, Nanoscience	2001-2004
Research Assistant	Pennsylvania State University, Physics	1999-2001
Research Assistant	University of Kentucky, Physics	1997-1999
Visiting Researcher	Institute for Molecular Science, Okazaki, Japan	1996
Teaching Assistant	University of Kentucky	1995-7
*Currently on leave		

RECENT HONORS:

Mead Endowment Honored Professor's Program	2009-2010
"For outstanding potential to become a friend of students and an example for other faculty."	
Fund for Excellence in Science and Technology (FEST) Award	2005
"For highly innovative research projects that will lead to strong proposals for outside funding and early career recognition."	

CURRENT WORK:

Began work with SAIC, based at the Naval Research Laboratory (NRL), in July 2010, while on leave from University of Virginia (UVa). Promoted to Program Manager at NRL in Fall 2010. Current work includes management of contracts in chemistry and materials science with values exceeding \$100M and 40+ scientific personnel based at NRL in Washington D.C. Past management duties included research program management the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland and at the Hollings Marine Laboratory in Charleston, S.C. Management duties include intellectual property management, financial and legal oversight, contract and subcontract oversight, client relations, proposal and white paper lead authorship, human resources activities, small business teaming and university outreach. Related activities include University outreach and development of business opportunities based on partnerships between academia, government, and industry. Recently coordinated successful \$19M contract win in the Chemistry Division at the Naval Research Laboratory, Washington D.C. Assuming visiting Professorship at the UVa School of Engineering and Applied Sciences (SEAS) in August 2012, in the Department of Electrical and Computer Engineering.

RECENT EXPERIMENTAL RESEARCH:

Director of experimental physics laboratory that combines optical and transport measurements on carbon and silicon nanoscale devices. Recent work includes design of silicon-based ‘surfets’ – field effect transistors (FETs) in which resonant channel surface scattering is actively controlled; this effort was funded by a Nanoscale Interdisciplinary Research Team (NIRT) grant from the National Science Foundation. Other work includes development of new spectroscopic techniques to study rotational hindrance in magnetic metallofullerenes, envisioning applications for magnetic memories and quantum computation. Research group has developed a novel, scanning-probe implementation of direct-write, near-field ultraviolet photolithography; ongoing work in this area is currently supported via a DARPA subcontract from Luna Corp. Other recent areas of research include graphene disorder mapping by surface-enhanced Raman spectroscopy, molecular dopant nanowire fabrication in silicon, and a collaborative biomedical wound repair project based on fabrication of actuatable artificial cilia.

EDUCATIONAL AND SYNERGISTIC WORK:

Instructor for numerous courses at the University level; recent courses included PHYS 1090 History of Physics (Spring 2012) and Physics 1610, Introductory Physics for Majors (Fall 2011) at the University of Virginia. Co-developed first ‘hands-on’ nanoscience course at UVa with Prof John Bean, funded by NSF Nanoscience Undergraduate Education (NUE) grant. Developed two additional new courses, including a course on renewable energy that spawned a textbook contract (Taylor & Francis). Routinely engaged in outreach to young scientists and engineers. At the Naval Research Laboratory, placed several young students in internships and currently managing some SAIC-sponsored research and outreach investments at UVa. Deeply engaged in university community projects with particular emphasis on experiential research. Most work has taken place in the capacity of Resident Faculty Fellow in the Hereford Residential College, at the University of Virginia (2007-2010). Related news links:

“Students and Faculty at Residential College Cultivate Food, Community” UVa Today,
<http://www.virginia.edu/uvatoday/newsRelease.php?id=6904>

“Learning and Growing: Garden as Laboratory at U.Va.” UVa Today,
<http://www.virginia.edu/uvatoday/newsRelease.php?id=9301>

“From Fryolator to Fuel Tank, Waste Cooking Oil Powers Jetta” UVa Today,
<http://www.virginia.edu/uvatoday/newsRelease.php?id=8523>

“Hereford College Renewed with New Focus on Sustainability” UVa Today,
<http://www.virginia.edu/uvatoday/newsRelease.php?id=10365>

“U.Va. Science & Art Project Focuses on Collaboration” UVa Today, Link:
<http://www.virginia.edu/uvatoday/newsRelease.php?print=1&id=7325>

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PUBLICATIONS:

Total journal citations: ~3000 as of Summer 2012 (ISI); article list below is current through 2011.

[22] Jack Chan, Brian Burke, Michael Cabral, Chong Hu, Joe Campbell, Lloyd Harriott, and Keith A. Williams, "Tuning transport in carbon nanotube field-effect transistors by low-energy electron beam exposure and applied universal backgate" *Journal of Physics: Condensed Matter* 22(33) 334212 (2010).

[21] Jack Chan, Brian Burke, Chong Hu, Joe Campbell, Lloyd Harriott, and Keith A. Williams, "Electron Beam Induced Two-State Noise in Carbon Nanotubes" *MRS Conf. Proceedings* (2009).

[20] Jack Chan, Brian Burke, Michael Cabral, Chong Hu, Joe Campbell, Lloyd Harriott, and Keith A. Williams, "Tuning transport in carbon nanotube field-effect transistors by low-energy electron beam exposure and applied universal backgate" *Journal of Physics: Condensed Matter* 22(33):334212 (2010).

[19] Brian Burke, Jack Chan, Keith Williams, Zili Wu, Alexander Puzos, David Geohegan, "Raman study of Fano interference in p-type doped silicon" *Journal of Raman Spectroscopy*, 41(12) 1759-1764 (2009).

[18] Brian G. Burke, Jack Chan, Keith A. Williams, Jiechao Ge, Chunying Shu, Wujun Fu, Harry C. Dorn, James G. Kushmerick, Alexander A. Puzos, David 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); Los Alamos Archive link: <http://arxiv.org/abs/0910.5273>.

[17] Chunying Shu, Jiechao Ge, Jianfei Zhang, Jae Hyun Sim, Brian G. Burke, Keith A. Williams, Nichole Rylander, Tom Campbell, David Geohegan, Alan R. Esker, Harry W. Gibson, and Harry C. Dorn, "A Facile High-speed Vibration Milling Method to Water-Solubilize Single-walled Carbon Nanohorns", *Chem. of Materials* 22(2) 347-351 (2009).

[16] Tsz Wah (Jack) Chan, Brian Burke, Kenneth Evans, Keith Williams, Smitha Vasudevan, Mingguo Liu, Joe Campbell, Avik Ghosh, "Multiple-Trap Correlations in the Room-Temperature Random Telegraph Signal of a Carbon Nanotube Field-Effect Transistor" *Physical Review B* 80, 033402 (2009).

[15] Brian G Burke, Timothy J Herlihy Jr, Andrew B Spisak and Keith A Williams, "Deep-UV Pattern generation in PMMA" *Nanotechnology* 19 215301 (2008).

[14] Hendrik A. Heering, Keith A. Williams, Simon de Vries, and Cees Dekker, "Specific vectorial immobilization of oligonucleotide-modified yeast cytochrome C on carbon nanotubes" *ChemPhysChem* 7(8) 1705-9 (2006).

[13] Iddo Heller, Jing Kong, Hendrik A. Heering, Keith A. Williams, Serge G. Lemay, and Cees Dekker, "Electrochemistry at Single Walled Carbon nanotubes: The Role of Band structure and Quantum Capacitance" *J. Am. Chem. Soc.* 128(22) 7353-9(2006).

[12] Iddo Heller, Jing Kong, Hendrik A. Heering, Keith A. Williams, Serge G. Lemay, and Cees Dekker, "Individual Single-Walled Carbon Nanotubes as Nanoelectrodes for Electrochemistry" *Nano Letters* 5(1)137-142 (2005).

[11] K.A. Williams, Peter T.M. Veenhuizen, Beatriz G. de la Torre, Ramon Eritja, Cees Dekker, "Carbon nanotubes with DNA Recognition", *Nature* 420(6917) 761 (2002).

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PUBLICATIONS, cont'd:

[10] K. A. Williams, B.K. Pradhan, P. C. Eklund, M. K. Kostov and M. W. Cole, "Raman Spectroscopic Investigation of H₂, HD, and D₂ Physisorption on Ropes of Single-Walled Carbon Nanotubes", *Phys. Rev. Lett.* 88(16) 165502 (2002).

[9] Bhabendra K. Pradhan, Gamini U. Sumanasekera, Clement K. W. Adu, Hugo E. Romero, Keith A. Williams, and Peter C. Eklund, "Experimental Probes of the Molecular Hydrogen-Carbon Nanotube Interaction", *Physica B* 323(1-4) 115-21 (2002).

[8] X. Fan, E.C. Dickey, P.C. Eklund, K.A Williams, L. Grigorian, R. Buczko, S.T. Pantelides, and S.J. Pennycook, "Atomic Arrangement of Iodine Atoms inside Single-Walled Carbon Nanotubes", *Phys. Rev. Lett.*, 84(20) 4621-4 (2000).

[7] K.A Williams and P.C. Eklund, "Monte Carlo Simulations of H₂ Physisorption in Finite-Diameter Carbon Nanotube Ropes", *Chem. Phys. Lett.*, 320(3/4) 352-8 (2000) .

[6] M.S. Dresselhaus, K.A Williams, and P.C. Eklund, "Hydrogen Adsorption in Carbon Materials", *MRS Bulletin*, 24(11) 45 (1999).

[5] K.A. Williams, M. Tachibana, J.L. Allen, L. Grigorian, S-C. Cheng, S.L. Fang, G.U. Sumanasekera, A.L. Loper, J.H. Williams, P.C. Eklund, "Single-Wall Carbon Nanotubes from Coal", *Chem. Phys. Lett.*, 310(1/2) 31-37 (1999).

[4] L. Grigorian, K.A. Williams, S. Fang, G.U. Sumanasekera, A.L. Loper, E.C. Dickey, S.J. Pennycook, P.C. Eklund, "Reversible Intercalation of Charged Iodine Chains into Carbon Nanotube Ropes" *Phys. Rev. Lett.*, 80(25) 5560-5563 (1998).

[3] S. Bandow, A.M. Rao, K.A. Williams, A. Thess, R.E. Smalley, P.C. Eklund, "Purification of Single Wall Nanotubes by Microfiltration" *J. Phys. Chem. B* 101(44) 839-8842 (1997).

[2] T. Terui, K.A. Williams, Y. Fujikawa, T. Arai, S. Mashiko, and Y. Maruyama, "Annealing Effect for LaxC₆₀ Thin Films", *Thin Solid Films* 331(1/2):113-116 (1998).

[1] A.M. Rao, E. Richter, S. Bandow, B. Chase, P.C. Eklund, K.A. Williams, S. Fang, K.R. Subbaswamy, M. Menon, A. Thess, R.E. Smalley, G. Dresselhaus, M.S. Dresselhaus, "Diameter-Selective Raman Scattering from Vibrational Modes in Carbon Nanotubes" *Science* 275(5297) 187 - 191(1997).

ARTICLES IN PREPARATION:

[1] Brian Burke and Keith Williams, "Raman Scattering Investigation of Rotational Hindrance in Y₂C₂@C₉₂", in prep. for J. Am. Chem. Soc. (spring 2010)

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CONFERENCE PROCEEDINGS:

[3] Jack Chan, Brian Burke, Chong Hu, Joe Campbell, Lloyd Harriott, and Keith A. Williams, "Electron Beam Induced Two-State Noise in Carbon Nanotubes" MRS Conf. Proceedings (accepted December 2009).

[2] Lingling Wu, Fernanda Camacho-Alanis, Keith Williams, Giovanni Zangari, Nathan Swami "Electrical contacts to Molecular Devices by Electroless Deposition of Copper on carboxylic acid terminated self-assembled monolayers on GaAs" Electrochemical Society Conf. proceedings (2007).

[1] K.A. Williams, Peter T.M. Veenhuizen, Beatriz G. de la Torre, Ramon Eritja, Cees Dekker, "Towards DNA-mediated Self Assembly of Carbon Nanotube Molecular Devices", AIP Conf. Proc. 633 (2002) 444.

RECENT PRESENTATIONS AND CHAIRING:

[7] Invited Seminar, "Electron Beam Tuning of Functional Carbon Nanostructures", Dept. of Physics, George Mason University, February 2010.

[6] Invited Talk, "Electron Beam Tuning of Functional Carbon Nanostructures", Oak Ridge CNMS Sciences Program Review, 10 December 2009.

[5] Invited Presentation, "Carbon Nanomaterials for Ultracapacitors" Commonwealth of Virginia Energy Symposium, VMI, October 7-8, 2009.

[4] "Observation of Fano Interference and Field Dependence by Raman Spectroscopy of Molecularly Doped Silicon" B. Burke, K.A. Williams, American Physical Society, Pittsburgh, March 2009.

[3] "Reversible current blockade of carbon nanotube through well resolved multitrapping-interactions" J.Chan, K.A. Williams, American Physical Society, Pittsburgh, March 2009.

[2] Session Chair, March Meeting of the American Physical Society, Pittsburgh, March 2009.

[1] Invited Seminar, Virginia Tech Department of Physics, "Molecular Electronics- A New Approach" January 2008.

DIGITAL PUBLICATIONS:

[3] Brian G. Burke, Jack Chan, Keith A. Williams, Jiechao Ge, Chunying Shu, Wujun Fu, Harry C. Dorn, James G. Kushmerick, Alexander A. Puretzky, David B. Geohegan, "Investigation of Gd₃N@C_{2n} (40 < n < 44) family by Raman and inelastic electron tunneling spectroscopy". LANL Cond-Mat. Archive <http://arxiv.org/abs/0910.5273>.

[2] Jack Chan, Brian Burke, Kenneth Evans, Keith Williams, Smitha Sudevan, Minguo Liu, Joe Campbell, Avik W. Ghosh, "Reversal of Current Blockade through Multiple-trap Correlations" LANL Cond-Mat. Archive <http://xxx.lanl.gov/abs/0901.2351>

[1] Keith A. Williams, Bhabendra K. Pradhan, Peter C. Eklund, Milen K. Kostov, Milton W. Cole, "Raman Spectroscopic Investigation of H₂, HD, and D₂ Physisorption on Ropes of Single-Walled, Carbon Nanotubes" LANL Cond-Mat. Archive <http://xxx.lanl.gov/abs/cond-mat/0104476>

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PATENTS ISSUED / PROVISIONAL:

[4] "Ciliated Pediatric Endotracheal Tube for Active Prevention of Ventilator-Associated Pneumonia and Related Method Thereof." Helmke BP, Williams KA., U.S. Provisional Patent Application Serial No. 61/179,576, filed May 19, 2009.

[3] "System and Method for Deep Ultraviolet Direct Write Photolithography" Keith A. Williams, Brian G. Burke and Andrew Spisak, Provisional Patent No. 60/959,870 (2007).

[2] P.C. Eklund, L. Grigorian, K.A. Williams and G.U. Sumanasekera, "Thermoelectric Materials Based on Intercalated Layered Metallic Systems", United States Patent No. 6,091,014(2000).

[1] P.C. Eklund, L. Grigorian, K.A. Williams and G.U. Sumanasekera, "Metallic Nanoscale Fibers from Stable Iodine-Doped Carbon Nanotubes", United States Patent No. 6,139,919(2000).

EXTERNAL FUNDING SOURCES:

[4] Hartwell Foundation, "Ciliated Pediatric Endotracheal Tube for Active Prevention of Ventilator-Associated Pneumonia", PI: Brian Helmke. Award: \$300k (2009-2012).

[3] DARPA, Phase II SBIR "193nm Superlens Imaging Structure" subcontract via Luna Corp. Award: \$40k/2 years (2009-2010).

[2] NSF 0609178 "NIRT: Surface State Engineering - Charge Storage and Conduction in Organo-Silicon Heterostructures as a Basis for Nanoscale Devices." NSF ECCS. John Bean (PI), Keith Williams (co-PI), Avik Ghosh (co-PI), Lin Pu (co-PI), Lloyd Harriott (co-PI). Award: \$1,306,000.00 / 4 yrs (2007-2010).

[1] NSF 0532515 "We're Not in Kansas Anymore" - A Hands-On Introduction to the New World of Nanoscience and Technology" NSF EEC. John Bean (PI), Keith Williams (co-PI). Award: \$200,000 / 2 yrs (2005-2007).

INTERNAL FUNDING SOURCES:

[4] University of Virginia Dissertation Year Fellowship, for Tsz-Wah (Jack) Chan.

[3] University of Virginia nanoSTAR Seed Fund, "Artificial Cilia for the Investigation of Cell Cooperativity in Wound Healing", \$30k/ 1 year. News link: <http://www.virginia.edu/nanostar/Programs/programs.html>

[2] University of Virginia Seed Fund for Collaborative Energy Research, \$30k/1 year (2008); News link: <http://www.virginia.edu/uvatoday/newsRelease.php?id=5959>

[1] University of Virginia Fund for Excellence in Science and Technology (FEST) Award, "Deep Ultraviolet Source for Maskless Photolithography and Resonant Raman Spectroscopy" \$50k/1 year (2005). News link: <http://www.virginia.edu/uvatoday/newsRelease.php?id=1354>

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NEW CURRICULUM DEVELOPED:

- PHYS 311 Widely Applied Physics: Energy Production, Distribution and Storage, a course on the subject of global energy challenges and sustainability. Textbook under development.
- PHYS 582 A Hands-On Introduction to Nanoscience; lab/lecture course with hands-on AFM, STM, SEM and nanofabrication instruction; funded in part by NSF NUE grant.

THESES:

- Ph.D. Dissertation, Dept. of Physics, Penn State, "Synthesis and Characterization of Single-Walled Carbon Nanotubes and Investigation of their Molecular Adsorption Properties" (2001).
- M.S. Thesis, University of Kentucky Dept. of Physics and Astronomy, "Transport Properties of Chalcogenide-Graphite Films Synthesized by Chemical Vapor Deposition" (1998).

GRADUATE RESEARCH

ADVISING:

B.G. Burke	Ph.D. 2010	Current Position: NIST
T.-W. Chan	Ph.D. 2010	Current Position: U.T. Dallas
C. Bu	Ph.D. student	
N. Anuniwat	Ph.D. student	
Deborah Park	Ph.D. student	

UNDERGRADUATE

ADVISING:

K.M. Evans	Currently in Graduate School, Rice Univ.
A. Spisak	Currently in Graduate School, Georgetown Univ.
Q. Vu	Currently in Medical School, Univ. of Virginia
K. Limtragool	B.S. student
A. Mathur	B.S. student

SERVICE / SYNERGISTIC ACTIVITIES:

- Referee for NSF NIRT, CAREER and DOE (BES) proposals and journals including: Physical Review Letters, Science, Nature, Nature Methods, Nature Materials, Nanotechnology, Journal of Physics, Chemical Physics Letters, Biomacromolecules, Nano Letters, ACS Nano, and several other journals.

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GRADUATE ADVISOR: P.C. Eklund (deceased), Pennsylvania State University, Department of Physics

POSTDOCTORAL ADVISOR: C. Dekker, T.U. Delft, Department of Bio-Nanoscience

PROFESSIONAL REFERENCES:

Joe C. Campbell Lucien Carr III Professor	University of Virginia Tel. (434) 243-2068	Electrical & Computer Engr. Email: jcuva@virginia.edu
Harry Dorn Professor	Virginia Tech. Tel. (540) 231-5953	Chemistry Email: hdorn@vt.edu
Avik Ghosh Assoc. Professor	University of Virginia Tel. (434) 243 2347	Electrical & Computer Engr. Email: ag7rq@Virginia.edu
Lloyd Harriott Professor and Chair	University of Virginia Tel. (434) 243-5580	Electrical & Computer Engr. Email: lrharriott@virginia.edu
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Lucy Russell Director	University of Virginia Tel. (434) 924-6058	Ctr. for Undergraduate Excellence Email: lsr2n@virginia.edu
Tom Skalak V.P. for Research	University of Virginia Tel. (434) 924-3606	Office of the V.P. for Research Email: vpresearch@virginia.edu
Nancy Takahashi Chair	University of Virginia Tel. (434) 906 1299	Landscape Architecture Email: takahashi@virginia.edu

Additional References and Other Information Available Promptly Upon Request