M. L. (Mike) Simpson

Group Leader and Distinguished R&D Staff
Nanofabrication Research Laboratory Group
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Education

University of Tennessee-Knoxville	Electrical Engineering	B.S. 1983
University of Tennessee-Knoxville	Electrical Engineering	M.S. 1987
University of Tennessee-Knoxville	Electrical Engineering	Ph.D. 1991

Professional Experience

2001 – Present	Group Leader, Nanofabrication Research Laboratory, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory
2001 – Present	Co-Theme Lead for the Emergent Properties Theme, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory
2001 – Present	Professor of Materials Sciences and Engineering (Joint Faculty Appointment), University of Tennessee, Knoxville
2010 – Present	Assistant Director UT/ORNL Center for Interdisciplinary Research and Graduate Education
1993 – Present	Adjunct Assistant Professor (Electrical and Computer Engineering)/Professor (Materials Science and Engineering Department, UT/ORNL Joint Faculty Appointment), University of Tennessee-Knoxville
1991 – Present	Research Staff Member /Distinguished R&D Staff, Oak Ridge National Laboratory

Professional and Synergistic Activities

2010 – Present	External Advisory Board for the BACTOCOM consortium led by Manchester Metropolitan University, United Kingdom
2009 – Present	Faculty Advisory Board for UT/ORNL Joint Institute for Biological Sciences
2009 – Present	Editorial Review Board for *International Journal of Natural Computing Research*
2008 – Present	Scientific Advisory Board, Vanderbilt Institute for Integrative Biosystems Research and Education
2006 – Present	Editorial Board of the journal *Nanomedicine: Nanotechnology, Biology and Medicine*
1989 – Present	Member: IEEE

Honors and Awards

2010	Inducted into the College of Fellows of the American Institute for Medical and Biomedical Engineering
2009	UT-Battelle Distinguished Scientist Award
2008	Elected Fellow of IEEE
2007	Named a Battelle Memorial Institute Distinguished Inventor
1998	Kermit Fischer Environmental Award for the Pioneering Development of an Integrated CMOS Photo-Spectrometer for Wide Applications including Environmental Monitoring
1998	Finalist for Discover Magazine Technology Innovation award for the development of the Bioluminescent Bioreporter Integrated Circuit

Publications (Over 140 refereed journal publications, Over 3,300 total cites, h-index=33)
Full publication list follows CV.

Research Synopsis

1. Noise Biology

We use experimental, analytical, and computational methods to understand the role of stochastic fluctuations in the function of complex nanoscale systems. Our model systems have included the study of autoregulatory systems in E. coli, the coupling between deterministic and stochastic responses in S. cerevisiae (yeast), and decision making in lentiviral systems.

2. Nano-Enabled Synthetic Biology

We use techniques of top-down and bottom-up fabrication coupled with hierarchical assembly of more complex structures to construct microscale systems with nanoscale features that mimic the functionality of biological cells. These systems typically consist of confined volume reaction chambers that are coupled to microfluidic channels. The reaction chambers are structured to retain large molecules (i.e. ribosomes. RNAP, large proteins), but to allow the free transport of amino acids and other small molecules needed to sustain cell-free transcription and translation.

3. Controlled Synthesis and Directed Assembly of Carbon Nanostructures

This work aims to create a fundamental understanding of the controlled synthesis and directed assembly of carbon nanofibers (CNFs). In particular, we have learned to control the position, shape, composition, internal structure, and orientation of CNFs. Furthermore, we have integrated this bottom-up synthesis technique into the top-down fabrication techniques used in the CNMS Nanofabrication Research Laboratory.

Graduate and Postdoctoral Advisors:

Graduate Advisor: Prof. J. M. Rochelle (University of Tennessee-Knoxville)

Thesis Advisor and Postgraduate-Scholar Sponsor:

Students (University of Tennessee-Knoxville)

R. G. Jackson, R. S. Smith, M. Vann, J. C. Arnott, G. Patterson, M. A. Guillorn, E. K. Bolton, D. W. Austin, M. Hale, E. Hullander, X. Yang, L. Zhang, B. Fletcher, K. Klein, R. D. Dar

Postdoctoral Scholars (recent):

A. V. Melechko, M. S. Allen, J. D. Fowlkes, L .M. Edwards, D. Peckys, D. Karig, (current)

Total Graduate Students Advised: 15
Total Postdoctoral Scholars Advised: 6

Publications

M. L. Simpson, Ph. D.
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Publications (*~3,300 total cites; h-index=33*)

20 Most Cited Publications (* 200 or more cites; ** 100 or more cites; * 50 or more cites)**

1. *** Melechko, A.V., V.I. Merkulov, T.E. McKnight, M.A. Guillorn, K.L. Klein, D.H. Lowndes, and M.L. Simpson. "Vertically aligned carbon nanofibers and related structures: Controlled synthesis and directed assembly." *J. Appl. Phy*., **97**(4), Feb. 15, 2005, 041301-39.

2. ** Merkulov, V. I. , M. A. Guillorn, D. H. Lowndes, M. L. Simpson, E. Voelkl, "Shaping carbon nanostructures by controlling the synthesis process", *Appl. Phys. Lett*., 79(8), August 20, 2001, 1178-1180.

3. ** Merkulov, V. I., A. V. Melechko, M. A. Guillorn, D. H. Lowndes, and M. L. Simpson. "Alignment mechanism of carbon nanofibers produced by plasma-enhanced chemical-vapor deposition". *Appl. Phys. Lett*., 79(18), October 29, 2001, 2970-2972.

4. * Austin, D. W., M. S. Allen, J. M. McCollum, R. D. Dar, J. R. Wilgus, G. S. Sayler, N. F. Samatova, C. D. Cox, & M. L. Simpson, "Gene Network Shaping of Inherent Noise Spectra", *Nature* 439, Feb. 2, 2006, 608-611.

5. * Merkulov, V. I., A. V. Melechko, M. A. Guillorn, D. H. Lowndes, M. L. Simpson, J. H. Whealton, R. J. Raridon. **"**Controlled alignment of carbon nanofibers in a large-scale synthesis process". *Appl. Phys. Lett*. 80(25), June 24, 2002, 4816-4818.

6. * Simpson, M. L., C. D. Cox, G. S. Sayler. "Frequency Domain Analysis of Noise in Autoregulated Gene Circuits". *Proc. Nat. Acad. Sci. USA 100*, April 15, 2003, 4551-4556.

7. * Guillorn, M. A., E.. D. Ellis, C. L. Britton, M. L. Simpson, A.V. Melechko, V.I. Merkulov , G.J. Bordonaro, D. Woodie, L.R. Baylor, and D. H. lowndes. "Operation of a gated field emitter using an individual carbon nanofiber cathode". *Appl. Phys. Lett.*, 79(21), November 19, 2001, 3506-3508.

8. * McKnight, T. E., A. V. Melechko, D. K. Hensley, G. D. Griffin, M. A. Guillorn, V. I. Merkulov, F. Serna, M. J. Doktycz, D. H. Lowndes, and M. L. Simpson. "Functional Intracellular Integration of Synthetic Nanostructures with Viable Cells for Non-Inheritable Genetic Modification". *Nanotechnology* 14, May 2003, 551-556.

9. * Guillorn, M. A., T. E. McKnight, A. Melechko, V. I. Merkulov, D. W. Austin, D. H. Lowndes and M. L. Simpson. "Individually addressable vertically aligned carbon nanofiber-based electrochemical probes". *J. Appl. Phys*. 91(6), March 15, 2002, 3824-3828.

10. * Simpson, Michael L., Gary S. Sayler, Steven Ripp, David E. Nivens, Bruce M. Applegate, Michael J. Paulus, and Gerald E. Jellison Jr. "Bioluminescent-Bioreporter Integrated Circuits Form Novel Whole-Cell Biosensors". *Trends Biotech.*, Vol. 16, August 1998, pp. 332-338.

11. * Guillorn, M. A., A. V. Melechko, V. I. Merkulov, D. K. Hensley, M. L. Simpson, and D. H. Lowndes. "Self-aligned gated field emission devices using single carbon nanofiber cathodes." *Appl. Phys. Letts.*, 81, Nov. 4, 2002, 3660-3662.

12. * McKnight, T. E., A. V. Melechko, G. D. Griffin, M. A. Guillorn, V. I. Merkulov, F. Serna, D. K. Hensley, M. J. Doktycz, D. H. Lowndes, and M. L. Simpson. "Intracellular integration of synthetic nanostructures with viable cells for controlled biochemical manipulation." *Nano Letts.* 4(7); July 7, 2004, 1213-1219.

13. * Simpson, M. L., G. S. Sayler, J. T. Fleming, and B. A. Applegate. "Whole-cell biocomputing: engineering the information processing functionality of cells". *Trends in Biotechnology* 19(8), August 2001, 317-323.

14. * Merkulov, V. I., D. K. Hensley, A. V. Melechko, M. A. Guillorn, D. H. Lowndes, and M. L. Simpson. "Control Mechanisms for the Growth of Isolated Vertically Aligned Carbon Nanofibers". *J. Phys. Chem. B* 106, 2002, 10570-10577.

15. * Bolton , E. K., G. S. Sayler, D. E. Nivens, J. M. Rochelle, S. Ripp, and M. L. Simpson. "Integrated CMOS Photodetectors and Signal Processing for Very Low-Level Chemical Sensing with the Bioluminescent Bioreporter Integrated Circuit". *Sens. Act. B* 85(1-2), June 20, 2002, 179-185.

16. Nivens, D. E., T. E. McKnight, S. A. Moser, S. J. Osbourn, M. L. Simpson, and G. S. Sayler, "Bioluminescent bioreporter integrated circuits: potentially small, rugged and inexpensive whole-cell biosensors for remote environmental monitoring," *J. Appl. Microbio.*, vol. 96, pp. 33-46, 2004.

17. Cui, H., X. Yang, M. L. Simpson, D. H. Lowndes, and M. Varela. "Initial growth of vertically aligned carbon nanofibers." *Appl. Phys. Letts.* 84(20), May 17, 2004, 4077-4079.

18. Baylor, L. R., V. I. Merkulov, E.D. Ellis, M. A. Guillorn, D. H. Lowndes, A. V. Melechko, M. L. Simpson, J. H. Whealton. "Field-emission from isolated individual vertically aligned carbon nanocones". *J. Appl. Phys.* 91(7), April 1, 2002, 4602-4606.

19. Melechko, A. V., V. I. Merkulov, D. H. Lowndes, M. A. Guillorn, and M. L. Simpson. "Transition between "Base" and "Tip" Carbon Nanofiber growth modes". *Chem. Phys. Letts.* 356, April 26, 2002, 527-533.

20. Zhang, L., D. Austin, V. I. Merkulov, M. A. Guillorn, A. V. Meleshko, D. H. Lowndes, and M. L. Simpson. "Four-probe charge transport measurements on individual vertically aligned carbon nanofibers." *Appl. Phys. Letts.* 84(20), May 17, 3972-3974.

Additional Journal Publications

21. Fuentes-Cabrera, M., B. H. Rhodes, M. I. Baskes, H. Terrones, J. D. Fowlkes, M. L. Simpson, and Philip D. Rack (2011), "Controlling the Velocity of Jumping Nanodroplets *Via* Their Initial Shape and Temperature," *ACS Nano*, in press.

22. Collier, C. P. and M. L. Simpson (2011), "Micro/nanofabricated environments for synthetic biology," *Curr. Opin. Biotech.*, **22**(4), 516-526.

23. Simpson, M. L., and P. T. Cummings (2011), "Fluctuations and Correlations in Physical and Biological Nanosystems: The Tale Is in the Tails," *ACS Nano*, **5**(4), 2425–2432.

24. Fuentes-Cabrera, M., B. H. Rhodes, J. D. Fowlkes, A. Lopez-Benzanilla, H. Terrones, M. L. Simpson, P. D. Rack (2011), "Molecular dynamics study of the dewetting of copper on graphite and graphene: Implications for nanoscale self-assembly," ***Phys. Rev. E* 83(4), 041603.**

25. Melechko, A. V., R. C Pearce, D. K. Hensley, M. L. Simpson and T. E. McKnight (2011), "Challenges in process integration of catalytic DC plasma synthesis of vertically aligned carbon nanofibers," *J. Phys. D: Appl. Phys.* **44**, 174008.

26. Karig, D. K., P. Siuti, R. D. Dar, S. T. Retterer, M. J. Doktycz, and M. L. Simpson (2011), "Model for Biological Communication in a Nanofabricated Cell-Mimic Driven by Stochastic Resonance," *Nano. Comm. Net*., **2**(1), 39-49.

27. Clearfield, R. J. G. Railsback, R. C. Pearce, D. K. Hensley, J. D. Fowlkes, M. Fuentes-Cabrera, M. L. Simpson, P. D. Rack and A. V. Melechko (2010), "Reactive solid-state dewetting of Cu–Ni films on silicon," *Appl. Phys. Letts.*, 97, 253101-1—3.

28. Dar, R. D., D. K. Karig, J. F. Cooke, C. D. Cox, and M. L. Simpson (2010), "Distribution and regulation of stochasticity and plasticity in *Saccharomyces cerevisiae*," *Chaos* **20**, 037106-1—8.

29. Singh, A, B. Razooky, C. D. Cox, M. L. Simpson, and L. S. Weinberger (2010), "Transcriptional Bursting from the HIV-1 Promoter Is a Significant Source of Stochastic Noise in HIV-1 Gene Expression," *Biophys. J*., 98, L32-L34.

30. Fletcher, B.L., J. T. Fern, K. Rhodes, T. E. McKnight, J. D. Fowlkes, S. T. Retterer, D. J. Keffer, M. L. Simpson, and M. J. Doktycz (2009), "Effects of ultramicroelectrode dimensions on the electropolymerization of polypyrrole," *J. Appl. Phys.* **105**, 124312-1—6.

31. Peckys, D. B., A. V. Melechko, M. L. Simpson, and T. E. McKnight (2009) "Immobilization and release strategies for DNA delivery using carbon nanofiber arrays and self-assembled monolayers," *Nanotech.* 20, 145304-1—8.

32. Simpson, M. L., C. D. Cox, M. S. Allen, J. M. McCollum, R. D. Dar, D. K. Karig, and J. F. Cooke, "Noise in biological circuits," invited Advanced Review in ***WIRE: Nanomed Nanobiotech.*, 1**(2), March-April 2009, **214-225**

33. Merkulov, I. A., K. L. Klein, and M. L. Simpson (2009) "A synergetic description of carbon nanofiber growth," *J. Appl. Phys.* **105**, 064305-1—8.

34. Guan, Y., J. D. Fowlkes, S. T. Retterer, M. L. Simpson and P. D Rack (2008) "Nanoscale lithography via electron beam induced deposition," *Nanotech*. 19 505302-1—6.

35. Peckys, D. B., N. de Jong, M. L. Simpson, T. E. McKnight (2008), "End-specific strategies of attachment of long double stranded DNA onto gold-coated nanofiber arrays," *Nanotechnology* 19, 435301-1 – 9.

36. Fowlkes, J. D., B. L. Fletcher, S. T. Retterer, A. V. Melechko, M. L. Simpson and M. J. Doktycz (2008), "Size-selectivity and anomalous subdiffusion of nanoparticles through carbon nanofiber-based membranes," *Nanotechnology* 19, 415301-1-12.

37. Retterer, S. T., A. Melechko, D. K. Hensley, M. L. Simpson and M. J. Doktycz (2008) "Positional control of catalyst nanoparticles for the synthesis of high density carbon nanofiber arrays," *Carbon* **46**(11), 1378-1383.

38. Sorge, K. D., K. L. Klein, A. V. Melechko, C. L. Finkel, O. Malkina, T. Leventouri, J. D. Fowlkes, P. D. Rack, and M. L. Simpson (2008) "Magnetic properties of Fe--Co catalysts used for carbon nanofiber synthesis," *J. Appl. Phy.*, vol. 104, pp. 033909-7.

39. Cox, C. D., J. M. McCollum, M. S. Allen, R. D. Dar, and M. L. Simpson (2008) "Using noise to probe and characterize gene circuits," *Proc. Nat. Acad. Sci*. **105**(31), 10809-10814.

40. Klein, K. L., S. J. Randolph, J. D. Fowlkes, L. F. Allard, H. M. Meyer III, M. L. Simpson and P. D. Rack (2008)"Single-crystal nanowires grown via electron-beam-induced deposition," *Nanotechnology* **19,** 345705-12.

41. Rack, P. D., Y. F. Guan, J. D. Fowlkes, A. V. Melechko, and M .L. Simpson (2008) "Pulsed laser dewetting of patterned thin metal films: A means of directed assembly," *Appl. Phys. Letts.* 92, 223108.

42. Guan Y. F., R. C. Pearce, A. V. Melechko, D. K. Hensley, M. L. Simpson, and P. D. Rack (2008), "Pulsed laser dewetting of nickel catalyst for carbon nanofiber growth", *Nanotechnology* **19**(23), 235604-1 – 4.

43. Karig, D. K., and M. L. Simpson (2008) "Tying new knots in synthetic biology", *HSFP Journal*, April 2008.

44. Weinberger, L. S., R. D. Dar, M. L. Simpson (2008) "Transient-mediated fate determination in a transcriptional circuit of HIV" *Nature Genetics*, **40**(4), 466-470.

45. Klein¸ K.L., A.V. Melechko, T.E. McKnight, J.D. Fowlkes, S.T. Retterer, P.D. Rack, D. Joy and M.L. Simpson (2008) "Surface Characterization and Functionalization of Carbon Nanofibers", *J. Appl. Phy.* **103**, 061301-1 - 061301-26.

46. Fletcher, B., S. Retterer, T.E. Mcknight, A. V. Melechko, J.D. Fowlkes, M. L. Simpson, M.J. Doktycz (2008) "Actuatable Membranes Based on Polypyrrole-Coated Vertically Aligned Carbon Nanofibers" *ACS Nano* 2(2), 247-254.

47. Mann, D., T. E. Mcknight, J. McPherson, P. Hoyt, A. V. Melechko, M. L. Simpson, and G. S. Sayler (2008) "Inducible RNAI-Mediated Gene Silencing Using Nanostructured Gene Delivery Arrays" *ACS Nano* **2**(1), 69-76.

48. Fuentes-Cabrera, M., M.I. Baskes, A. V. Melechko, and M. L. Simpson (2008) "Bridge structure for the graphene/Ni(111) system: a first principles study" *Phys. Rev. B.* **77**, 035405-1 – 035405-5.

49. Randolph, S. J., J. D. Fowlkes, A. V. Melechko, K. L. Klein, H. M. Meyer III, M. L. Simpson, and P. D. Rack (2007) "Controlling thin film structure for the dewetting of catalyst nanoparticle arrays for subsequent carbon nanofiber growth", *Nanotechnology* **18**, 465304-1-8.

50. Melechko, A. V., K. L. Klein, J. D. Fowlkes, D. K. Hensley, I. A. Merkulov, T. E. McKnight, P. D. Rack, J. A. Horton, M. L. Simpson (2007) "Control of carbon nanostructure: from nanofiber toward nanotube and back", *J. Appl. Phys* .**102**(7), 074314-1 – 7.

51. Merkulov, I. A., V. I. Merkulov, A.V. Melechko, K. L. Klein, D. H. Lowndes, and M. L. Simpson (2007) "Instability of catalytic growth interface in carbon nanofiber synthesis", *Phys. Rev. B.*, **76**, 014109-1 – 14109-8.

52. Yu, Z., T. E. McKnight, M. N. Ericson, A. V. Melechko, M. L. Simpson, B. Morrison III (2007) Vertically aligned carbon nanofiber arrays record hippocampal slice electrophysiological signals, *Nano Letts.* **7**(8), 2188 – 2195.

53. Guan, Y.F., A.V. Melechko, A.J. Pedraza, M.L. Simpson, and P.D. Rack (2007) "Non-Lithographic Organization of Nickel Catalyst for Carbon Nanofiber Synthesis on Laser-Induced Periodic Surface Structures", *Nanotechnology* **18**, 335306-335312.

54. Doktycz, M. J. and M. L. Simpson, "Nano-enabled synthetic biology," *Mol Syst Biol*, vol. 3, 2007.

55. Fletcher, B. L., T. E. McKnight, J. D. Fowlkes, D. P. Allison, M. L. Simpson, M. J. Doktycz (2007) Controlling the Dimensions of Carbon Nanofiber Structures through the Electropolymerization of Pyrrole. *Synth. Metals* **157**, 282-289.

56. Mann, D. G. J., McKnight, T. E., Melechko, A. V., Simpson, M. L. & Sayler, G. S. (2007) Quantitative Analysis of EDC-Condensed DNA on Vertically Aligned Carbon Nanofiber Gene Delivery Arrays. *Biotechnol. Bioeng*. **97**(4), 680-688.

57. Yang, X., W. L. Gardner, L. R. Baylor, H. Cui, D. H. Lowndes, D. C. Joy, and M. L. Simpson (2007) "Electron-beam focusing characteristics of double-gated carbon nanofiber based field emission sources," *J. Vac. Sci. & Tech. B*, vol. 25, pp. 394-399.

58. Allen, M. S., Wilgus, J. R., Chewning, C. S., Sayler, G. S. & Simpson, M. L. (2007) *Sys. Synth. Bio*. **V1,** 3-9.

59. Yan, L., Allen, M.S., Simpson, M.L., Sayler, G.S. and Cox, C.D. (2007) Direct quantification of N-(3-oxo-hexanoyl)-l-homoserine lactone in culture supernatant using a whole-cell bioreporter. *J. Microbio. Meth.*, **68**, 40-45.

60. Leventouri, T., Melechko, A.V., Sorge, K.D., Klein, K.L., Fowlkes, J.D., Rack, P.D., Anderson, I.M., Thompson, J.R., McKnight, T.E. and Simpson, M.L. (2006) Magnetic alloys in nanoscale biomaterials. *Met. and Mat. Trans. a-Phys. Met. and Mat. Sci.*, **37A**, 3423-342

61. Simpson, M. L. "Cell-free synthetic biology: a bottom-up approach to discovery by design," *Mol. Syst. Biol.*, vol. 2, 2006.

62. Fowlkes, J. D., E. D. Hullander, B. L. Fletcher, S. T. Retterer, A. V. Melechko, D. K. Hensley, M. L. Simpson, and M. J. Doktycz, "Molecular transport in a crowded volume created from vertically aligned carbon nanofibres: a fluorescence recovery after photobleaching study," *Nanotechnology* **17,** (2006) 5659-5668.

63. Dhindsa, M. S., N. R. Smith, J. Heikenfeld, P. D. Rack, J. D. Fowlkes, M. J. Doktycz, A. V. Melechko, and M. L. Simpson, "Reversible Electrowetting of Vertically Aligned Superhydrophobic Carbon Nanofibers", *Langmuir* **22**, October 10, 2006, 9030-9034.

64. McKnight, T. E., A. V. Melechko, B. L. Fletcher, S. W. Jones, D. K. Hensley, D. B. Peckys, G. D. Griffin, M. L. Simpson, & M. N. Ericson, "Resident Neuroelectrochemical Interfacing Using Carbon Nanofiber Arrays", *J. Phys. Chem. B.* **110**(31), August 10, 2006, 15317-15327.

65. Jun, S.-I., P. D. Rack, T.E. McKnight, A.V. Melechko, & M. L. Simpson, "Low-temperature solid-phase crystallization of amorphous silicon thin films deposited by rf magnetron sputtering with substrate bias." *Appl. Phys. Letts.* **89**, 2006, 022104-3.

66. McKnight, T. E., C. Peeraphatdit, S. W. Jones, J. D. Fowlkes, B. L. Fletcher, K. L. Klein, A. V. Melechko, M. J. Doktycz, & M. L. Simpson, "Site-Specific Biochemical Functionalization along the Height of Vertically Aligned Carbon Nanofiber Arrays", *Chem. Mater.* **18**, 3203-3211 (2006).

67. Fletcher, B. L., T. E. McKnight, A. V. Melechko, D. K. Hensley, D. K. Thomas, M. N. Ericson, & M. L. Simpson, "Transfer of Flexible Arrays of Vertically Aligned Carbon Nanofiber Electrodes to Temperature Sensitive Substrates", *Adv. Mat.* 18(13), July 2006, 1689-1694.

68. Cox, C. D., J. M. McCollum, D. W. Austin, M. S. Allen, R. D. Dar & M. L. Simpson, "Frequency Domain Analysis of Noise in Simple Gene Circuits", *Chaos* 16, June 2006, 026102-1 – 026102-15.

69. Fletcher, B. L. T. E. McKnight, A. V. Melechko, M. L. Simpson, & M. J. Doktycz, "Biochemical Functionalization of Vertically Aligned Carbon Nanofibers", *Nanotechnology* 17(8), April 2006, 2032-2039.

70. Klein, K. L., A. V. Melechko, J. D. Fowlkes, P. D. Rack, D. K. Hensley, H. M. Meyer, L. F. Allard, T. E. McKnight, & M. L. Simpson, "Formation of Ultrasharp Vertically Aligned Cu-Si Nanocones by a DC Plasma Process," *J. Phys. Chem. B*, vol. 110, pp. 4766-4771, 2006.

71. Fowlkes, J. D., A. V. Melechko, K. L. Klein, P. D. Rack, D. A. Smith, D. K. Hensley, M. J. Doktycz, & M. L. Simpson, **"**Control of catalyst particle crystallographic orientation in vertically aligned carbon nanofiber synthesis," *Carbon* 44(8,) pp 1503-1510, 2006.

72. McCollum, J. M., G. D. Peterson, C. D. Cox, M. L. Simpson, & N. F. Samatova, "The sorting direct method for stochastic simulation of biochemical systems with varying reaction execution behavior", *Comp. Bio. and Chem.* 30, Feb. 2006, 39-49.

73. Fowlkes, J. D., B. L. Fletcher, E. D. Hullander, K. L. Klein, D. K. Hensley, A. V. Melechko, M. L. Simpson & M. J. Doktycz, "Tailored transport through vertically aligned carbon nanofibre membranes; controlled synthesis, modelling, and passive diffusion experiments," *Nanotechnology* 16, Dec. 2005, 3101-3109.

74. Jun, S.-I., P.D. Rack, T.E. McKnight, A.V. Melechko, & M.L. Simpson "DC substrate bias effects on amorphous silicon sputter deposited films and integration and characterization of a sputter deposited thin film transistor array," *Appl. Phys. Letts.* **87**, 2005, 132108.

75. Sanseverino, J., R. K. Gupta, A. C. Layton, S. S. Patterson, S. A. Ripp, L. Saidak, M. L. Simpson, T. W. Schultz, & G. S. Sayler, "Use of Saccharomyces cerevisiae BLYES Expressing Bacterial Bioluminescence for Rapid, Sensitive Detection of Estrogenic Compounds," *Appl. Environ. Microbiol.*, 71, August 2005, 4455-4460.

76. Jun, S.-I., T.E. McKnight, A. V. Melechko, M. L. Simpson, & P. D. Rack "Characterisation of reactively sputtered silicon oxide for thin-film transistor fabrication", *Electron. Letts.* 41 (14), July 7, 2005, 59- 60.

77. Merkulov, I. A., A. V. Meleshko, J. C. Wells, H. Cui, V. I. Merkulov, M. L. Simpson, & D. H. Lowndes, "Two growth modes of graphitic carbon nanofibers with herring-bone structure," *Phys. Rev. B*, vol. 72, 2005, 045409.

78. Klein, K. L., A. V. Melechko, P. D. Rack, J.D. Fowlkes, H. M. Meyer, & M. L. Simpson. "Cu-Ni composition gradient for the catalytic synthesis of vertically aligned carbon nanofibers." *Carbon* vol 43 (9), 2005, 1857-1863.

79. Yang, X., M. L. Simpson, S. J. Randolph, P. D. Rack, L. R. Baylor, H. Cui, & W. L. Gardner, "Integrated tungsten nanofiber field emission cathodes selectively grown by nanoscale electron beam-induced deposition," *Appl. Phys. Letts.*, **86**, 2005, 183101-1.

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