Vivek Subramanian

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Education

3 / 96 - 6 / 98

Ph.D. in Electrical Engineering, Stanford University
Stanford, California
Honors earned: Graduate Fellowship, Eastman Kodak Company

9 / 94 - 3 / 96

MS in Electrical Engineering, Stanford University
Stanford, California

8 / 90 - 5 / 94

BS in Electrical Engineering, Louisiana State University
Baton Rouge, Louisiana
Honors earned: Summa cum laude, College Honors, Outstanding Senior, Junior and Sophomore, Honors College

Professional Experience

2000 - present

Department of Electrical Engineering & Computer Sciences, University of California
Berkeley, CA

7/11 – present: Professor
7/05 – 7/11: Associate Professor
7/00-7/05: Assistant Professor
Research, teaching and service in EECS Department
Honors Earned:

Nominated to MIT's Technology Review top 100 young innovators list (TR100), 2002
National Science Foundation Young Investigator (CAREER) Award, FY2002,
Nominated to National Academy of Engineering's *Frontiers of Engineering*, 2002
Winner of 2002 Paul Rappaport Award for best paper in an IEEE EDS Journal
Best paper award, 2004 IEEE Device Research Conference
Outstanding Teaching Award, EECS Department, UC Berkeley, 2005
2008 Printed Electronics Champion, Printed Electronics USA Conference, November 2008
Outstanding paper award, 2012 IMAPS Microelectronics Conference

2009 - present

Principal Investigator and Adjunct Professor, World Class University Program, Sunchon National University
Sunchon, Korea
Principal Investigator leading large research program focused on developing a new department in the area of printed electronics including 9 faculty covering multiple disciplines and 4 different countries

2000 - present

Independent Consultant
Orinda, CA
Consultant to the semiconductor industry and its associated fields in the following areas:

Memory technology and design, Silicon Process Technology
Display / Imager and Flexible Electronics Technology, RFID Technology
Intellectual Property Consulting
Technology Evaluation / Venture Capital due diligence

2004 – present

Founding Scientific Advisor, Kovio, Inc.
Sunnyvale, CA
Scientific advising to printed electronics startup company

2008 – 2011

Chief Technical Advisor, QuSwami, Inc.
San Francisco, CA
Scientific advising to energy conversion device startup company
Served as CTO from July 2010-June 2011

1998-2000

Consulting Assistant Professor, Electrical Engineering Department, Stanford University.
Stanford, CA

1998-2000	**Visiting Research Engineer, Electrical Engineering Department, University of California.** ***Berkeley, CA*** Research into 25nm MOSFET technologies for giga-scale integration
1998 - 2000	**Founder, Matrix Semiconductor, Inc.** ***Santa Clara, CA*** Co-founder and technical advisor of startup company working on high-density memory technology **Honors Earned:** Nominated to Scientific American's SA50 List for Visionary Technology Finalist for 2003 World Technology Award for Information Technology Hardware Winner, 2005 EDN Innovation Award
1998	**Co-instructor, Electrical Engineering Department, Stanford University.** ***Stanford, CA*** Co-teaching of EE311, Advanced Integrated Circuit Fabrication Processes
1997	**Intern, Advanced Product Research and Development Laboratory, Motorola Inc.** ***Austin, TX*** Research into process development issues affecting SiGe SEMFET devices
1996	**Head Teaching Assistant EE410: IC Fabrication Laboratory, Stanford University** ***Stanford, CA*** Coordination and instruction of EE410, graduate level laboratory course.
1994-1998	**Research Assistant, Electrical Engineering, Stanford University** ***Stanford, CA*** Research into crystallization of amorphous Si and SiGe films using low thermal budget processes.

Professional Affiliations and Activities

Chair, Scientific Advisory Board, iPACK, Royal Institute of Technology (KTH), Sweden, 2011 to date

Tampere Institute of Technology Faculty Search Committee, Finland, 2013

University of Oulu Faculty Search Committee, Finland, 2013

Served as external thesis committee member for several universities world-wide, including University of Cape Town (South Africa), Tampere Institute of Technology (Finland), Technical University of Eindhoven (Netherlands), Indian Institute of Science (India), Indian Institute of Technology (India), 2009 to date

Technical Program Chair, Large Area, Organic, and Printed Electronics Conference, 2012-2013

Scientific Committee, Large Area, Organic, and Printed Electronics Conference, 2009-2011

Scientific Committee, International Conference on Printed and Flexible Elecronics, 2009-2013

IEEE Electron Devices Society Organic Electronics Committee, 2003 - 2005
Executive Committee, International Electron Device Meeting, 2003 to 2009
Technical Program Committee, International Electron Device Meeting, 2001-2002
Technical Program Committee member, Device Research Conference, 2000-2002

Technical Program Committee member, VLSI-TSA Conference, 2005
Member, Institute of Electrical and Electronic Engineers

Publications and Patents

Published more than 200 technical papers in international journals and conferences and 30 patents covering several aspects of semiconductor devices, materials, circuit design, process technology and memory architecture.

List of Patents, Publications and Presentations

Patents

1. "Vertically stacked field programmable nonvolatile memory and method of fabrication", M. Johnson, T. Lee, V. Subramanian, M. Farmwald, and J. M. Cleeves, US Patent 8,503,215
2. "Process-variation tolerant series-connected NMOS and PMOS diodes, and standard cells, tags, and sensors containing the same", V. Subramanian, P. Smith, US Patent 8,471,308
3. "Printed compatible designs and layout schemes for printed electronics", Z. Wang, V. Subramanian, L. Cleveland, US Patent 8,383,952
4. "Method for making surveillance devices with multiple capacitors", P. Smith, C. Choi, J. M. Cleeves, V. Subramanian, A. Kamath, S. Molesa, US Patent 8,296,943
5. "High reliability surveillance and/or identification tag/devices and methods of making and using the same", V. Subramanian, P. Smith, V. Pavate, A. Kamath, C. Choi, A. Chandra, and J. M. Cleeves, US Patent 8,264,359
6. "High reliability surveillance and/or identification tag/devices and methods of making and using the same", V. Subramanian, P. Smith, V. Pavate, A. Kamath, C. Choi, A. Chandra, and J. M. Cleeves, US Patent 8,227,320
7. "Vertically stacked field programmable nonvolatile memory and method of fabrication", M. Johnson, T. Lee, V. Subramanian, M. Farmwald, and J. M. Cleeves, US Patent 8208282
8. "Reliable tag deactivation",J. M. Cleeves, V. Subramanian, US Patent 8138921
9. "Combined static and dynamic frequency divider chains using thin film transistors", V. Subramanian, US Patent 8085068
10. "Process-variation tolerant diode, standard cells including the same, tags and sensors containing the same, and methods for manufacturing the same", V. Subramanian, P. Smith, US Patent 7932537
11. "Three terminal nonvolatile memory Device with vertical gated diode", T. H. Lee, V. Subramanian, J. M. Cleeves, M. G. Johnson, P. M. Farmwald, I. G. Kouznetsov, US Patent 7825455
12. "Vertically stacked field programmable nonvolatile memory and method of fabrication", V. Subramanian, J. M. Cleeves, US Patent 7816189
13. "Multi-mode tags and methods of making and using the same", P. Smith, J. M. Cleeves, V. Pavate, V. Subramanian, US Patent 7750792
14. "Method of manufacturing complementary diodes", V. Subramanian, P. Smith, US Patent 7528017
15. "Vertically stacked field programmable nonvolatile memory and method of fabrication", V. Subramanian, J. M. Cleeves, US Patent 7319053
16. "Vertically stacked field programmable nonvolatile memory and method of fabrication", V. Subramanian, J. M. Cleeves, US Patent 7265000
17. "Vertically stacked field programmable nonvolatile memory and method of fabrication", V. Subramanian, J. M. Cleeves, US Patent 7160761
18. "Vertically stacked field programmable nonvolatile memory and method of fabrication", V. Subramanian, J. M. Cleeves, US Patent 7157314
19. "Dense arrays and charge storage devices", T. H. Lee, V. Subramanian, J. M. Cleeves, A. J. Walker, C. Petti, I. Kouznetzov, M. G. Johnson, P. M. Farmwald. B. Herner, US Patent 7129538
20. "Patterning three dimensional structures", C. K. Li, J. N. Knall, M. A. Vyvoda, J. M. Cleeves, V. Subramanian, US Patent 7071565
21. "Monolithic three dimensional array of charge storage devices containing a planarized layer", T. H. Lee, V. Subramanian, J. M. Cleeves, A. J. Walker, C. J. Petti, I. G. Kouznetzov, M. G. Johnson, P. M. Farmwald, and B. Herner, US Patent 6881994
22. "Vertically stacked field programmable nonvolatile memory and method of fabrication", M. G. Johnson, T. H. Lee, V. Subramanian, and P. M. Farmwald, US Patent 6780711

23. “Thermal processing for three dimensional circuits”, V. Subramanian, J. M. Cleeves, J. N. Knall, C. K. Li, and M. A. Vyvoda, US Patent 6770939
24. “Multigate semiconductor device with vertical channel current and method of fabrication”, J. M. Cleeves and V. Subramanian, US Patent 6677204
25. “Thermal processing for three dimensional circuits”, V. Subramanian, J. M. Cleeves, J. N. Knall, C. K. Li, and M. A. Vyvoda, US Patent 6624011
26. “Multigate semiconductor device with vertical channel current and method of fabrication”, J. M. Cleeves and V. Subramanian, US Patent 6580124
27. “Patterning three dimensional structures”, C. K. Li, J. N. Knall, M. A. Vyvoda, J. M. Cleeves, and V. Subramanian, US Patent 6627530
28. “Low cost three-dimensional memory array”, M. Johnson, T. Lee, V. Subramanian, P. Farmwald, J. Knall, US Patent 6515888
29. “Integrated circuit structure including three-dimensional memory array”, M. Johnson, T. Lee, V. Subramanian, P. M. Farmwald, J. M. Cleeves, US Patent 6385074.
30. “FINFET transistor structures having double gate channel extending vertically from a substrate and methods of manufacture”, C. Hu, T-J. King, V. Subramanian, L. Chang, X. Huang, Y-K. Choi, J. T. Kedzierski, N. Lindert, J. Bokor, W-C. Lee, US Patent 6413802
31. “Vertically stacked field programmable nonvolatile memory and method of fabrication”, M. Johnson, T. Lee, V. Subramanian, M. Farmwald, and J. M. Cleeves, US Patent 6185122.
32. “Vertically Stacked Field Programmable Nonvolatile Memory and Method of Fabrication”, M. Johnson, T. Lee, V. Subramanian, M. Farmwald, and J. M. Cleeves, US Patent 6034882.
33. “Vertically Stacked Field Programmable Nonvolatile Memory and Method of Fabrication”, M. Johnson, T. Lee, V. Subramanian, M. Farmwald, and J. M. Cleeves, US Patent 6351406.
34. “Vertically Stacked Field Programmable Nonvolatile Memory and Method of Fabrication”, M. Johnson, T. Lee, V. Subramanian, M. Farmwald, and J. M. Cleeves, US Patent 6483736.

Invited Magazine Articles, Books, Chapters, and Monographs

1. Chapter in “Inkjet Technology for Digital Fabrication”, Editors: Ian M. Hutchings, Graham D. Martin, Wiley, ISBN: 978-0470681985
2. Chapter in “Applications of Organic and Printed Electronics: A Technology-Enabled Revolution (Integrated Circuits and Systems), Editor: E. Cantatore, ISB: 978-1-461-43159-6
3. Chapter in “Inkjet-based Micromanufacturing”, Editors: Korvink, Smith, Shin, Wiley, ISBN: 978-3-527-31904-6
4. Chapter in “Organic Electronics II. More Materials and Applications", Editor: H. Klauk, Wiley, ISBN: 978-3-527-32647-1
5. Chapter in “Transparent Electronics: From Synthesis to Applications”, Editors: A. Facchetti and T. Marks, Wiley, ISBN: 978-0-470-99077-3, 2010.
6. Chapter in “The chemistry of inkjet inks”, Editor: S. Magdassi, World Scientific Publishing Company, ISBN: 978-9812818218, 2009
7. Chapter in “Organic Field-Effect Transistors”, Editors: Z. Bao, and J. Locklin, CRC Press, ISBN: 978-0849380808, 2007
8. “Developments in printed RFID”, V. Subramanian, Pira Publishing, UK, 2006.
9. “3D Chips: Future Possibilities”, V. Subramanian, Silicon India, Feb 2003, pp. 24-25

Invited Conference Presentations

1. ***Invited***, “Printed Eelectronics: The Confluence of Printing and Semionductors”, Canadian Printed Electronics Symposium, Montreal, Canada, April 9, 2013.
2. ***Invited “***Modeling, scaling, and integration of gravure printing for fast switching Organic FETs”, V. Subramanian, S. J. S. Morris, H. Kang, Materials Research Society Fall 2012 Meeting, Boston, MA, Nov 25-30, 2012

3. ***Invited***, "Printed Nanoparticles as routes to high-performance printed conductors: Synthesis, Printing Processes, and Device Applications", V. Subramanian, H. Kang, R. Kitsomboonloha, and S. K. Volkman, The 2012 International Conference on Flexible and Printed Electronics ICFPE2012, Tokyo, Japan, September 6th - 8th, 2012

4. ***Invited*** "Advanced Printing Processes for High-Performance Printed Transistors", V. Subramanian, Flextech Workshop on Printing Electronics - Ink and Substrate Interactions, Kalamazoo, MI, August 1-2, 2012

5. ***Invited*** "High-performance Printed Transistors: Materials, Processes, and Devices", V. Subramanian, 2nd CPEM International Symposium "Organic Semiconductors and Printed Electronics", Gyeonggi, South Korea, May 10th, 2012.

6. ***Invited*** "Highly-Scaled Gravure and Inkjet Printed Organic Transistors: Tools, Processes, and Devices", Hongki Kang & Vivek Subramanian, 2012 Flextech Flexible Electronics and Display Conference, Phoenix, AZ, Feb 5-9, 2012.

7. ***Plenary*** "Nanomaterials for printed electronics: synthesis, design, and applications", V. Subramanian, International Conference on Nano Science and Nano Technology, Sunchon, Korea, November 11th, 2011.

8. ***Invited*** "Advances in scaling of printed transistors", V. Subramanian, International Seminar on Printed Electronics, Seoul, Korea, June 8th, 2011.

9. ***Invited*** "High-Performance Fully Printed Transistors: Materials, Processes, and Device Characteristics", V. Subramanian, H. Tseng, R. Kitsomboonloha, and A. de la Fuente Vornbrock, 2011 Electrochemical Society Meeting, Montreal, Canada, May 2011

10. ***Invited*** "From Droplets to Devices: Printed Transistor Processes, Integration, and Characteristics", Vivek Subramanian, Daniel Soltman, Huai-Yuan Tseng, Rungrot Kitsomboonloha and Alejandro de la Fuente Vornbrock, Materials Research Society Spring Meeting, San Francisco, CA, April 2011

11. ***Keynote*** "Printed electronics: Innovations in tools, materials, devices, and applications", V. Subramanian, 2011 Korea Printed Electronics Association (KoPeA) meeting, Seoul, Korea, March 2011

12. ***Keynote*** "Printed RF tags and sensors: the confluence of printing and semiconductors", V. Subramanian, F. Liao, and H-Y. Tseng, The European Microwave Integrated Circuits Conference 2010, Paris, France, September 2010.

13. ***Invited*** "Droplet-on-demand direct patterning of active materials: materials, modeling, and integration", V. Subramanian, The 2010 IEEE Lithography Workshop, Kuai, Hawaii, November 2010

14. ***Plenary*** "Printed electronics: where are we, and where are we going", V. Subramanian, 2010 Large Area Organic, and Printed Electronics Convention (LOPE-C), Frankfurt, Germany, June 2010.

15. ***Keynote*** "Printed RFID: Technology Trends and Outlook", V. Subramanian, IEEE International Conference on RFID 2010, Orlando, Florida, April 2010.

16. ***Invited*** "Mechanistic studies on sintering of nanoparticles for formation of solution-processed thin films", 2010 Spring meeting of the Materials Research Society, San Francisco, CA, April 2010.

17. ***Invited*** "Printed Electronics: the confluence of printing and semiconductors", Vivek Subramanian, 2009 International Conference on Flexible and Printing Electronics, Jeju Island, Korea, Nov 2009.

18. ***Invited*** "Organic Transistor Vapor and Biosensors – Technology Status and Implementation Issues", Vivek Subramanian, Frank Liao, Lakshmi Jagannathan, Electrochemical Society Meeting, Vienna, Austria, October 2009.

19. ***Invited*** "Printed transistors for low-cost electronics: the confluence of printing and printable electronic materials", Vivek Subramanian, Alejandro de la Fuente Vornbrock, Steven Molesa, Daniel Soltman, Huai-Yuan Tseng, and Steven K. Volkman, SPIE Optics + Photonics, August 2-6, 2009, San Diego, CA

20. ***Invited*** "Printed Zinc Oxide Based Electronics: Materials, Devices, and Outlook", V. Subramanian, S. K. Volkman, and D. R. Redinger, LOPE-C, June 23-25, 2009, Frankfurt, Germany

21. ***Invited*** "Printed Devices for Low-Cost Electronics: Technology Status and Outlook", V. Subramanian, PETEC Inaugural Event, March 17, 2009, Durham, United Kingdom

22. ***invited*** "Printed Electronic Tags and Sensors for Smart Packaging Applications", Vivek Subramanian, Josephine Chang, Lakshmi Jagannathan, Frank Liao, Steve Molesa, David Redinger, Daniel Soltman, Huai-Yuan Tseng, Steve Volkman, Shong Yin, 2009 Flexible Electronics and Display Conference, Phoenix, AZ, Feb 2-5, 2009.

23. ***invited*** "Electronic Nose Sensors for Consumer Packaging", V. Subramanian, IDTechEx Printed Electronics USA, San Jose, CA, Dec 2-5, 2008.

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