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## Educational History

- Ph. D. in electrical engineering. Minor in physics. June, 1992. **Stanford University**, Stanford, CA. Thesis: Electron Transport in Mesoscopic Conductors
- M. S. E. E. 1988. **Stanford University**, Stanford, CA
- B. S. E. *summa cum laude* in electrical engineering and engineering physics. June, 1987. **Princeton University**, Princeton, NJ

## Honors

- 2008 Blavatnik Young Faculty Award Finalist, New York Academy of Science.
- 2008 Fellow of the IEEE
- 2006 ISLPED Low Power Design contest
- 2005 IBM Pat Goldberg Memorial Best Paper Award for the January, 2005 paper. Uniform-phase, uniform-amplitude resonant-load global clock distributions, published in the IEEE Journal of Solid-State Circuits
- 2005 Distinguished Faculty Award, NYSTAR
- 2003 International Symposium on Low-Power Design Low-Power Design Contest winner
- 2003 International Symposium on Asynchronous Circuits and Systems, best paper award runner-up
- 2001 International Conference on Computer Design best paper award.
- 1999 Distinguished Faculty Teaching Award from the Columbia Engineering Alumni Association.
- NSF CAREER Faculty Early Career Development award. 1998.
- IBM Early Faculty Development Award. 1998. 1999.
- IBM Research Division awards for the G4 S/390 microprocessor design. 1995-1997.
- Hertz Foundation Doctoral Thesis Prize. 1992.
- Fannie and John Hertz Foundation Fellowship. 1987.
- National Science Foundation .Creativity in Engineering. research grant for graduate research. 1987.
- Valedictorian of Princeton Class of 1987
- Silver Medal of the Royal Society of Arts. Princeton University. 1987. For an outstanding student in engineering or architecture.
- James Hayes-Edgar Palmer Prize in Engineering. Princeton University. 1987. For the student showing the greatest promise for future engineering achievement.
- Peter Mark Prize in Engineering Physics. Princeton University. 1987.
- Phi Beta Kappa Prize for the senior with the highest academic standing. Princeton University. 1987.
- George B.Wood Legacy Prize for 1985-86. Princeton University. For the highest academic standing for the junior year.
- Phi Beta Kappa, Sigma Xi, Tau Beta Pi

## Work Experience

- **Columbia University** 1997-present. Currently Lau Family Professor of Electrical Engineering and Biomedical Engineering.
- **Quicksilver Biosciences, Inc.** 2018-present. Co-Founder and Technical Advisor.
- **Ferric, Inc.** 2012-present. Co-Founder and Chairman of the Board of Directors.
- **Cadence Design Systems, Inc.** Senior Architect (consultant). 2001-2006.
- **CadMOS Design Technology, Inc.** Co-founder and Chief Technical Officer. 1997-2001. The company was acquired by Cadence in 2001.
- **IBM T. J. Watson Research Center**. Research Staff Member. 1992-1997. Manager. 1996-1997. VLSI Design Department. Lead engineering for the design methodology of a 400 MHz custom S/390 CMOS microprocessor.
- **Columbia University**. Adjunct assistant professor of electrical engineering. 1994-1997. Teach courses in devices physics and circuit design.
- **Bell Communications Research.** Summer, 1987. Fabrication, characterization, and modelling of GaAs/AlGaAs heterojunction bipolar transistors.
- **General Electric Company,** Military and Data Systems Operation, Space Systems Division. Summers of 1985, 1986. Studied the propagation of electromagnetic radiation through the troposphere, stratosphere, and ionosphere including scattering from turbulence in the neutral atmosphere and ionospheric scintillation.

## Professional activities

- Technical program committee, International Solid-State Circuits Conference, 2008-2010.
- Technical program committee, International Electron Device Conference, 2009-present.
- Technical program committee, Symposium on VLSI Circuits, 2007-2010.
- Conference co-chair for International Symposium on Quality Electronic Design, 2004.
- Program subcommittee chair for DAC 2004.
- General chair for International Conference on Computer Design, 2003.
- Technical program chair for the International Conference on Computer Design, 2002
- Technical program chair for the International Symposium on Quality Electronic Design, 2003.
- Program subcommittee chair for ICCAD 2003.
- Program committee for ICCAD, GLS-VLSI, ISCAS, ISQED, TAU, DAC.
- Associate Editor of IEEE Journal of Solid-State Circuits, 2008 – present.
- Associate Editor of IEEE Journal of Biomedical Circuits and Systems, 2011-present
- Associate Editor of IEEE Transactions on VLSI, 1999 - 2001.
- Reviewer for IEEE Design and Test, IEEE Transactions on Computers, IEEE Transactions on Circuits and Systems, IEEE Transactions on CAD, IEEE Journal of Solid-State Circuits, IEEE Transactions on VLSI, National Science Foundation, Nature Nanotechnology, Nano Letters, Solid-State Electronics.

## Publications

*Book contributions*

- K. L. Shepard, V. Narayanan, and R. Rose, Harmony: A methodology for noise analysis in deep submicron digital integrated circuits, reprinted in *Signal Integrity Effects in Custom IC and ASIC Design*, Raminderpal Singh, editor, IEEE Press, 2002.
- K. L. Shepard and D.-J. Kim, Static noise analysis for digital integrated circuits in partially-depleted silicon-on-insulator technology, reprinted in *Signal Integrity Effects in Custom IC and ASIC Design*, Raminderpal Singh, editor, IEEE Press, 2002.
- M. L. Roukes, K. L. Shepard, and B. P. van der Gaag, Electron scattering experiments in mesoscopic conductors, in Science and Technology of Mesoscopic Structures, Springer-Verlag, 1991.

*Journal and magazine publications*

- Andreas J.W. Hartel, siddharth Shekar, Peijie Ong, Indra Schroeder, Gerhard Thiel, Kenneth L. Shepard. High bandwidth approaches in nanopore and ion channel recordings – A tutorial review. **Analytica Chimica Acta.** January 5, 2019, DOI: 10.1016/j.aca.201901.034
- Siddharth Shekar, Chen-Chi Chien, Andreas Hartel, Peijie Ong, Oliver B Clarke, Andrew Marks, Marija Drndic, and Kenneth L Shepard. Wavelet Denoising of High-Bandwidth Nanopore and Ion-Channel Signals. **Nano Letters** January 2, 2019, DOI: 10.1021/acs.nanolett8b04388.
- Krishna Jayant, Michael Wenzel, Yuki Bando, Jorndan P Hamm, Nicola Mandriota, Jake H Rabinowitz, Ilan Jen-La Plante, Jonathan S Owen, Ozgur Sahin, Kenneth L Shepard, and Rafael Yuste. Flexible Nanopipettes for Minimally Invasive Intracellular Electrophysiology In Vivo. **Cell Reports** January 2, 2019, DOI: doi.org/10.1016/celrep.2018.12.019.
- Yuhao Zhang, Min Sun, Josh Perozek, Zhihong Liu, Ahmad Zubair, Daniel Piedra, Nadim Chowdhury, Xiang Gao, Kenneth Shepard, and Tomás Palacios. Large Area 1.2 kV GaN Vertical Power FinFETs with a Record Switching Figure-of-Merit. **IEEE Electron Device Letters** DOI 10.1109/LED.2018.2880306 November 9, 2018
- Hyungsik Kim, Gwan-Hyoung Lee, James Hone, and Kenneth L. Shepard. Ambipolar Memristive Phenomenon in Large-Scale, Few-Layered αMoO3 Recrystallized Films. **Advanced Material Interfaces** 2018 DOI: 10.1002/admi.201801591
- Young Duck Kim, Yuanda Gao, Ren-Jye Shiue, Lei Wang , Ozgur Burak Aslan, Myung-Ho Bae, Hyungsik Kim, Dongjea Seo, Heon-Jin Choi, Suk Hyun Kim, Andrei Nemilentsau, Tony Low, Cheng Tan, Dmitri K. Efetov, Takashi Taniguchi, Kenji Watanabe, Kenneth L. Shepard, Tony F. Heinz, Dirk Englund, and James Hone. Ultrafast Graphene Light Emitters. **Nano Letters** DOI: 10.1021/acs.nanolett.7b04324,Publication Date (Web): January 16, 2018.
- Yoonhee Lee, Scott M. Trocchia, Steven B. Warren, Erik F. Young, Sefi Vernick, and Kenneth L. Shepard, "Electrically Controllable Single-Point Covalent Functionalization of Spin-Cast Carbon-Nanotube Field-Effect Transistor Arrays". **ACS Nano** Publication Date: September 27, 2018, DOI: 10.1021/acsnano.8b03073.
- Andreas J. W. Hartel, Peijie Ong, Indra Schroeder, M. Hunter Giese, Siddharth Shekar, Oliver B. Clarke, Ran Zalk, Andrew R. Marks, Wayne A. Hendrickson and Kenneth L. Shepard. Single-channel recordings of RyR1 at microsecond resolution in CMOS-suspended membranes. **PNAS** February 20, 2018. 115 (8) E1789-E1798, DOI:10.1073/pnas.1712313115.
- David Tsai, Rafael Yuste, and Kenneth L. Shepard. Statistically Reconstructed Multiplexing for Very Dense, High-Channel-Count Acquisition Systems. **IEEE Transactions on Biomedical Circuits and Systems**, 12(1), 13-23.
- Oliver Rauh, Ulf-Peter Hansen, Sebastian Mach1, Andreas J.W. Hartel, Kenneth L. Shepard, Gerhard Thiel and Indra Schroeder. Extended beta distributions open the access to fast gating in bilayer experiments—assigning the voltage-dependent gating to the selectivity filter. **FEBS Letters.** DOI: 10.1002/1873-3468.12898. Volume 591, Issue 23, December 2017, Pages 3850–3860.
- David Tsai, Daniel Sawyer, Adrian Bradd, Rafael Yuste & Kenneth L. Shepard. A very large-scale microelectrode array for cellular- resolution electrophysiology. **Nature Communications** 8, Article number: 1802 (2017) | DOI: 10.1038/s41467-017-02009-x
- Ko-Tao Lee, Can Bayram, Daniel Piedra, Edmund Sprogis, Hariklia Deligianni, Balakrishnan Krishnan, George Papasouliotis, Ajit Paranjpe, Eyal Aklimi, Ken Shepard, Tomás Palacios, and Devendra Sadana. GaN Devices on a 200 mm Si Platform Targeting Heterogeneous Integration. **IEEE Electron Device Letters** (Volume: 38, Issue: 8, Aug. 2017 ).
- S. Vernick, S. M. Trocchia, S. B. Warren, E. F. Young, D. Bouilly, R. L. Gonzalez, C. Nuckolls, and K. L. Shepard, "Electrostatic melting in a single-molecule field-effect transistor with applications in genomic identification," **Nature Communications**, 2017.
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- Warren S.B, Vernick S, Romano E, Shepard K.L. Complementary Metal-Oxide-Semiconductor Integrated Carbon Nanotube Arrays: Toward Wide-Bandwidth Single-Molecule Sensing Systems. **Nano Lett.** 2016 Apr 13;16(4):2674-9. doi: 10.1021/acs.nanolett.6b00319. Epub 2016 Mar 24. PubMed PMID: 26999579; PubMed Central PMCID: PMC5319850.
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- Delphine Bouilly, Jason Hon, Nathan S. Daly, Scott Trocchia, Sefi Vernick, Jaeeun Yu, Steven Warren, Ying Wu, Ruben L. Gonzalez, Jr., Kenneth L. Shepard, and Colin Nuckolls Single-Molecule Reaction Chemistry in Patterned Nanowells **NanoLetters** DOI: 10.1021/acs.nanolett.6b01657
- Tarun Chari, Rebeca Ribeiro-Palau, Cory R. Dean, and Kenneth Shepard Resistivity of Rotated Graphite−Graphene Contacts **NanoLetters** DOI: 10.1021/acs.nanolett.6b01657
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- Michael Lekas, Sunwoo Lee, Wujoon Cha, James Hone, and Kenneth Shepard Third-order intermodulation distortion in graphene resonant channel transistors, **Applied Physics Letters** 106, 073504 (2015); doi: 10.1063/1.491346
- Jacob K. Rosenstein, Serge G. Lemay, Kenneth L. Shepard. Single-molecule bioelectronics, **WIREs**. 22 December 2014. DOI: 10.1002/wnan.1323
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- Nicholas Petrone, Inanc Merici, Tarun Chari, Kenneth L. Shepard, and James Hone. Graphene Field-Effect Transistors for Radio-Frequency Flexible Electronics, **Journal of the Electron Devices Society**, 3:21. DOI: 10.1109/JEDS.2014.2363789
- Haig Norian, Ryan M. Field, Ioannis Kymissis and Kenneth L. Shepard An integrated CMOS quantitative-polymerase-chain-reaction lab-on-chip for point-of-care diagnostics, Lab Chip, 2014, Advance Article
- R.M. Field, S. Realov, and K.L. Shepard A 100-fps, Time-Correlated Single-Photon-Counting-Based Fluorescence-Lifetime Imager in 130-nm CMOS, **IEEE Journal of Solid-State Circuits**, vol.49, no.4 (2014) advanced online version.
- D.L. Bellin, H. Sakhtah, J.K. Rosenstein, P.M. Levine, J. Thimot, K. Emmet, L.E.P. Dietrich, and K.L. Shepard Integrated circuit-based electrochemical sensor for spatially resolved detection of redox-active metabolites in biofilms, **Nature Communications** 5:3256 (2014) doi:10.1038/ncomms4256
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- Xuetao Gan, Ren-Jye Shiue, Yuanda Gao, Inanc Meric, Tony F. Heinz, Kenneth Shepard, James Hone, Solomon Assefa & Dirk Englund, "Chip-integrated ultrafast graphene photodetector with high responsivity" **Nature Photonics** (2013) doi:10.1038/nphoton.2013.253
- Ryan P. Davies , ChengCheng , Noah Sturcken , William E. Bailey , and Kenneth L. Shepard, "Coupled Inductors With Crossed Anisotropy CoZrTz/$SiO_2$Multilayer Cores," **IEEE Transactions On Magnetics**, Vol. 49, No. 7, July 2013
- I. Meric, C.R. Dean, N. Petrone, L. Wang, J. Hone, P. Kim, and K.L. Shepard, "Graphene Field-Effect Transistors Based on Boron–Nitride Dielectrics," **Proceedings of the IEEE**, Vol. 101, No. 7., July 2013
- C. R. Dean, L. Wang, P. Maher, C. Forsythe, F. Ghahari, Y. Gao, J. Katoch, M. Ishigami, P. Moon, M. Koshino, T. Taniguchi, K.Watanabe, K. L. Shepard, J.Hone & P. Kim, "Hofstadter's butterfly and the fractal quantum Hall effect in moiré superlattices," **Nature**, 2013.
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- J. K. Rosenstein, S. Ramakrishnan, J. Roseman, and K. L. Shepard, "Single ion channel recordings with CMOS-anchored lipid membranes," **Nano Letters**, Advanced On Line publication (May 1, 2013)
- S. Realov and K. L. Shepard, "Analysis of Random Telegraph Noise in 45-nm CMOS Using an On-Chip Characterization System ," **IEEE Transactions on Electron Devices**, May, 2013
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K. L. , “A 2.5D Integrated Voltage Regulator Using Coupled-Magnetic-Core Inductors on Silicon Interposer,” **IEEE Journal of Solid-State Circuits**, January, 2013

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