NAME: Jeffrey Bokor **POSITION TITLE: Professor**

RESEARCH AND PROFESSIONAL EXPERIENCE:

EDUCATION

Ph.D, Electrical Engineering, Stanford University, Stanford, CA, 1980.
M.S., Electrical Engineering, Stanford University, Stanford, CA, 1976.
B.S., Electrical Engineering, Massachusetts Institute of Technology, Cambridge, MA, 1975

PROFESSIONAL EXPERIENCE

UNIVERSITY OF CALIFORNIA

Electrical Engineering and Computer Science Department
Professor, Berkeley, CA, 1993-present.

Joint Appointment: 2004- present, Deputy Director for Science, The Molecular Foundry, Lawrence Berkeley National Laboratory

Joint Appointment: 1993-2004, Group Leader for Advanced Lithography, Center for X-ray Optics, Lawrence Berkeley National Laboratory

Current research interests:

Nanotechnology
Solid-state implementation of quantum information processing
Deep sub-micron silicon VLSI technology, fabrication, and device physics
Extreme ultraviolet (EUV) lithography
Optical metrology
Interferometry and Fourier optics

Classroom teaching:

Undergraduate and graduate courses in semiconductor physics and technology

Undergraduate and graduate courses in optical physics and engineering

Freshman seminar introduction to electrical engineering

AT&T BELL LABORATORIES

Ultra-Large Scale Integrated Circuits (ULSI) Technology Research Department
Department Head, Murray Hill, NJ, 1990-1993.

Leader of group of 15 Ph.D. scientists, 35 total technical personnel. Responsible for directing research to create technologies relevant to silicon IC manufacturing in the year 2000. Also responsible for continuing improvement and operation of 20,000 sq. ft. Class 100 research cleanroom facility.

ULSI Process integration
Deep sub-micron silicon MOSFET device physics
Device and circuit design
Advanced process and device modelling software
Advanced lithography

Laser Science Research Department
Department Head, Holmdel, NJ, 1987-1990.

Leader of group of 10 Ph.D. scientists, 20 total technical personnel. Managed diverse program of basic research in optical physics. Conducted high visibility personal research program.

X-ray lithography
Nonlinear optics
Picosecond optoelectronics
Femtosecond phenomena in electronic materials
Fiber optics

Atomic physics

Quantum Electronics Research Department
Member of Technical Staff, Holmdel, NJ, 1980-1987.

Independently directed basic research.

Nonlinear optics
Picosecond optoelectronics
Semiconductor device physics
Ultraviolet laser technology

PROFESSIONAL AFFILIATIONS

Fellow, Optical Society of America; Fellow, American Physical Society; Fellow, Institute of Electronics and Electrical Engineers; American Association for the Advancement of Science

RECENT PROFESSIONAL ACTIVITIES

Program Committee, CMOS devices, International Electron Devices Meeting, 1999-2000
General Co-chair, Quantum Electronics and Laser Science Conference, Baltimore, MD, 1997.
Users Executive Committee, Advanced Light Source, Lawrence Berkeley National Laboratory, 1994-1996. Chair, 1996.
Program Co-chair, Quantum Electronics and Laser Science Conference, Baltimore, MD, 1995.
Chairman, Technical Group on X-ray and XUV Physics, Optical Society of America, 1991-1994.
Cochairman, Topical Meeting on Soft X-ray Projection Lithography, Monterey, CA, April, 1991.

PUBLICATIONS

Complete listing of over 210 publications, including links to files is available at:
http://www.eecs.berkeley.edu/~jbokor/Full_text_pubs/Bokor_pubs.complete.html

Selected recent publications:

1. *Choi, Y.-K., Chang, L., Ranade, P., Lee, J.-S., Ha, D., Balasubramanian, S., Agarwal, A., Ameen, M., King, T.-J., and Bokor, J.* "FinFET process refinements for improved mobility and gate work function engineering," IEDM Technical Digest, *p. 259-262, 2002.*
2. *Goldberg, K. A., Naulleau, P., and Bokor, J.* "Fourier transform interferometer alignment method," Appl. Opt. 41 *(22), 4477-4483, 2002.*
3. *Goldberg, K. A., Naulleau, P., Bokor, J., and Chapman, H. N.* "Honing the accuracy of extreme ultraviolet optical system testing: At-wavelength and visible-light measurements of the ETS Set-2 projection optic," Proc. SPIE 4688, *p. 329-337, 2002.*
4. *Lee, J.-S., Choi, Y.-K., Ha, D., King, T.-J., and Bokor, J.* "Low-frequency noise characteristics in p-channel FinFETs," IEEE Electron Device Lett. 23 *(12), 722-724, 2002.*
5. *Naulleau, P., Goldberg, K. A., Anderson, E. H., Attwood, D., Batson, P., Bokor, J., Denham, P., Gullikson, E., Harteneck, B., Hoef, B., Jackson, K., Olynick, D., Rekawa, S., Salmassi, F., Blaedel, K., Chapman, H., Hale, L., Mirkarimi, P., Soufli, R., Spiller, E., Sweeney, D., Taylor, J., Walton, C., O'Connell, D., Tichenor, D., Gwyn, C. W., Yan, P.-Y., and Zhang G.* "Sub-70 nm extreme ultraviolet lithography at the Advanced Light Source static microfield exposure station using the engineering test stand set-2 optic," J. Vac. Sci. Technol. B 20*(6), 2829-2833, 2002.*
6. *Park, M., Yi, M., Mirkarimi, P., Larson, C., and Bokor, J.* "Characterization of extreme ultraviolet lithography mask defects by actinic inspection with broadband extreme ultraviolet illumination," J. Vac. Sci. Technol. B 20*(6), 3000-3005, 2002.*
7. *Schenkel, T., Persaud, A., Park, S. J., Meijer, J., Kingsley, J. R., McDonald, J. W., Holder, J. P., Bokor, J., and Schneider, D. H.* "Single ion implantation for solid state quantum computer development," J. Vac. Sci. Technol. B 20*(6), 2819-2823, 2002.*
8. *Xiong, S., Bokor, J., Xiang, Q., Fisher, P., Dudley, I., and Rao, P.* "Study of gate line edge roughness effects in 50 nm bulk MOSFET devices," Proc. SPIE 4689, *p. 733-741, 2002.*
9. *Yeo, Y.-C., Subramanian, V., Kedzierski, J., Xuan, P., King, T.-J., Bokor, J., and Hu, C.* "Design and fabrication of 50-nm thin-body p-MOSFETs with a SiGe heterostructure channel," IEEE Trans. Electron Dev. 49 *(2), 279-286, 2002.*

10. *Yi, M., Park, M., Mirkarimi, P., Larson, C., and Bokor, J.* "At-wavelength inspection of defect smoothing in EUVL masks," Proc. SPIE 4688, *p. 395-400, 2002.*
11. *Yu, B., Chang, L., Ahmed, S., Wang, H., Bell, S., Yang, C.-Y., Tabery, C., Ho, C., Xiang, Q., King, T.-J., Bokor, J., Hu, C., Lin, M.-R., and Kyser, D.* "FinFET scaling to 10nm gate length," IEDM Technical Digest, *p. 251-254, 2002.*
12. *Chang, L., Choi, Y.-K., Ha, D., Ranade, P., Xiong, S., Bokor, J., Hu, C., and King, T.-J.* "Extremely scaled silicon nano-CMOS devices," Proc. IEEE 91 *(11), 1860-1873, 2003.*
13. *Chang, L., Choi, Y.-K., Kedzierski, J., Lindert, N., Xuan, P., Bokor, J., Hu, C., and King, T.-J.* "Moore's Law lives on," IEEE Circuits and Devices Mag. 19 *(1), 35-42, 2003.*
14. *Choi, Y.-K., Grunes, J., Lee, J. S., Zhu, J., Somorjai, G. A., Lee, L. P., and Bokor, J.* "Sub-lithographic patterning technology for nanowire model catalysts and DNA label-free hybridization detection," Proc. SPIE 5220, *10-19, 2003.*
15. *Choi, Y.-K., Ha, D., King, T.-J., and Bokor, J.* "Investigation of gate-induced drain leakage (GIDL) current in thin body devices: Single-gate ultra-thin body, symmetrical double-gate, and asymmetrical double-gate MOSFETs," Jpn. J. Appl. Phys. 42 *(Part 1, No. 4B), 2073-2076, 2003.*
16. *Choi, Y.-K., Ha, D., Snow, E., Bokor, J., and King, T.-J.* "Reliability study of CMOS FinFETs," IEDM Technical Digest, *p. 177-180, 2003.*
17. *Choi, Y.-K., Lee, J. S., Zhu, J., Somorjai, G. A., Lee, L. P., and Bokor, J.* "Sublithographic nanofabrication technology for nanocatalysts and DNA chips," J. Vac. Sci. Technol. B 21*(6), 2951-2955, 2003.*
18. *Choi, Y.-K., Zhu, J., Grunes, J., Bokor, J., and Somorjai, G. A.* "Fabrication of sub-10-nm silicon nanowire arrays by size reduction lithography," J. Phys. Chem. B 107 *(15), 3340-3343, 2003.*
19. *Goldberg, K. A., Naulleau, P., Denham, P., Rekawa, S. B., Jackson, K., Anderson, E. H., Liddle, J. A., and Bokor, J.* "EUV interferometry of the 0.3-NA MET optic," Proc. SPIE 5037, *p. 69-74, 2003.*
20. *Lee, J.-S., Choi, Y.-K., Ha, D., Balasubramanian, S., King, T.-J., and Bokor, J.* "Hydrogen annealing effect on DC and low-frequency noise characteristics in CMOS FinFETS," IEEE Electron Device Lett. 24 *(3), 186-188, 2003.*
21. *Lee, J.-S., Ha, D., Choi, Y.-K., King, T.-J., and Bokor, J.* "Low-frequency noise characteristics of ultrathin body p-MOSFETs with molybdenum gate," IEEE Electron Device Lett. 24 *(1), 31-33, 2003.*
22. *Naulleau, P. P., Goldberg, K. A., Batson, P., Bokor, J., Denham, P., and Rekawa, S.* "Fourier-synthesis custom-coherence illuminator for extreme ultraviolet microfield lithography," Appl. Opt. 42 *(5), 820-826, 2003.*
23. *Pu, N.-W. and Bokor, J.* "Study of surface and bulk acoustic phonon excitations in superlattices using picosecond ultrasonics," Phys. Rev. Lett. 91 *(7), 076101/1-4, 2003.*
24. *Schenkel, T., Persaud, A., Park, S. J., Nilsson, J., Bokor, J., Liddle, J. A., Keller, R., Schneider, D. H., Cheng, D. W., and Humphries, D. E.* "Solid state quantum computer development in silicon with single ion implantation," J. Appl. Phys. 94 *(11), 7017-7024, 2003.*
25. *Shumway, M. D., Naulleau, P., Goldberg, K. A., Snow, E. L., and Bokor, J.* "Resist evaluation at 50 nm in the EUV using interferometric spatial frequency doubled imaging," Proc. SPIE 5037, *p. 910-916, 2003.*
26. *Xiong, S. and Bokor, J.* "Sensitivity of double-gate and FinFET devices to process variations," IEEE Trans. Electron Dev. 50 *(11), 2255-2261, 2003.*
27. *Xuan, P. and Bokor, J.* "Investigation of NiSi and TiSi as CMOS gate materials," IEEE Electron Device Lett. 24 *(10), 634-636, 2003.*
28. *Xuan, P., She, M., Harteneck, B., Liddle, A., Bokor, J., and King, T.-J.* "FinFET SONOS flash memory for embedded applications," IEDM Technical Digest, *p. 609-612, 2003.*
29. *Shumway, M. D., Snow, E. L., Goldberg, K. A., Naulleau, P., Cao, H., Chandhok, M., Liddle, J. A., Anderson, E. H., and Bokor, J.* "EUV resist imaging below 50 nm using coherent spatial filtering techniques," Proc. SPIE 5374, *454-459, 2004.*
30. *Tseng, Y.-C., Xuan, P., Javey, A., Malloy, R., Wang, Q., Bokor, J., and Dai, H.* "Monolithic integration of carbon nanotube devices with silicon MOS technology," Nano Lett. 4 *(1), 123-127, 2004.*
31. *Wang, Y., Bokor, J., and Lee, A.* "Maskless lithography using drop-on-demand inkjet printing method," Proc. SPIE 5374, *p. 628-636, 2004.*
32. *Xiong, S. and Bokor, J.* "A simulation study of gate line edge roughness effects on doping profiles of short-channel MOSFET devices," IEEE Trans. Electron Dev. 51 *(2), 228-232, 2004.*