

**Khalil Najafi, Fellow, IEEE**

Schlumberger Professor of Engineering, Arthur F. Thurnau Prof.  
Department of Electrical Engineering and Computer Science  
Biomedical Engineering  
UNIVERSITY OF MICHIGAN

1301 Beal Avenue  
Ann Arbor, MI, 48109-2122  
Phone: (734) 763-6650  
Fax: (734) 763-9324  
E-mail: najafi@umich.edu

**Role in the Center: Deputy Director, Navigation Team Leader, Co-Investigator**

**Areas of Research:** Power generation and scavenging, packaging, inertial sensors

**A. PROFESSIONAL PREPARATION**

University of Michigan

Electrical Engineering, B.S., 1980

University of Michigan

Electrical Engineering, M.S., 1981

University of Michigan

Electrical Engineering, Ph.D., 1986

**B. APPOINTMENTS**

**Director**, Michigan's National Nanotechnology Infrastructure Network (NSF) 2004-present

**Deputy Director**, NSF Eng'g Research Center For Wireless Integrated Microsystems 2000-present

**Director**, Solid-State Electronics Laboratory, EECS Department, University of Michigan 1998-2005

**Professor**, EECS Department, University of Michigan 1998-present

**Visiting Professor**, Physical Electronics Laboratory, Swiss Federal Institute of Technology 1997-1998

**Visiting Professor**, Microelectronics Center, Denmark Technical University, Denmark 1998

**Associate Professor**, EECS Department, University of Michigan 1993-1998

**Assistant Professor**, EECS Department, University of Michigan 1990-1993

**Assistant Research Scientist**, EECS Department, University of Michigan 1988-1990

**Co-founder and member of Board of Directors**, Integrated Sensing Systems (ISSYS), Inc. 1996

**C. SYNERGISTIC ACTIVITIES**

Professor Najafi has been involved in the development of solid-state sensors, actuators, and integrated circuits for over 20 years. One of the most important aspects of his research is its very multi-disciplinary nature. Prof. Najafi has worked on a broad spectrum of research topics throughout his career, and has done this in close collaboration with many researchers, as noted below. The research areas he has been involved with include:

- Design of high-performance and low-power interface and signal processing circuitry for Microsystems;
- Development of micropackaging technologies for biomedical applications, and for Microsystems;
- Development of micromachining and MEMS fabrication technologies;
- Development of new sensor and actuator structures with improved performance for different applications. He has specifically been involved in the development of next-generation high-performance accelerometers and gyroscopes;
- Development of new devices for fluid mechanics research, flow control, and micropropulsion;
- Development of integration technologies for combining MEMS and IC's on a single chip;
- Development of wireless and telemetry integrated circuits for implantable biomedical Microsystems.

**D. RELATED PUBLICATIONS**

1. S. Nikles, R.M. Bradley, S. Bledsoe, and K. Najafi, "Design and Testing of Conductive Polysilicon Beam Leads for Use in a High-Density Biomedical Connector," J. Micromechanics and Microengineering, 14, No. 7, pp. 957-968, July 2004
2. J. Chae, H. Kulah, and K. Najafi, "An In-Plane High-Sensitivity, Low-Noise Micro-g Silicon Accelerometer with CMOS Readout Circuitry," IEEE/ASME Journal of Microelectromechanical Systems (JMEMS), vol. 13, no. 4, p 628-635, August, 2004

3. M. Ghovanloo, K. Najafi, "A Modular 32-site Wireless Neural Stimulation Microsystem," *IEEE J. Solid-State Circuits*, Vol. 39, No. 12, pp. 2457-2466, Dec. 2004
4. M. Ghovanloo, K. Najafi, "A Wideband Frequency-Shift Keying Wireless Link for Inductively Powered Biomedical Implants," *IEEE Trans. On Circuits and Systems I: Fundamental Theory and Applications*, Vol. 51, No. 12, pp. 2374-2383, Dec. 2004
5. J. Chae, H. Kulah, and K. Najafi, "A CMOS-compatible high aspect ratio silicon-on-glass in-plane micro-accelerometer," *J. Micromechanics & Microengineering*, 15, No. 2, pp. 336-345, Feb. 2005
6. P. Mohseni, and K. Najafi, "Wireless Multichannel Biopotential Recording Using an Integrated FM Telemetry Circuit," 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS), San Francisco, CA., Sept. 1-4, 2004
7. N. Yazdi, H. Kulah, and K. Najafi, "Precision Readout Circuits for Capacitive Microaccelerometers", Third IEEE International Conference on Sensors, pp. 28-31, Vienna, Austria, October 24-27, 2004
8. A.B. Ucok, J. Giachino, and K. Najafi, "Modular Assembly/Packaging Of Multi-Substrate Microsystems (WIMS Cube) Using Thermo-Magnetically Actuated Cables," *Proceedings of the IEEE Micro Electro Mechanical Systems (MEMS)*, pp. 536-539, Miami, Florida Jan. 2005
9. S. Lee, J. Chae, S. Yoon, N. Yazdi, and K. Najafi, "Low-power Thermal Isolation for Environmentally Resistant Microinstruments", *Proceedings of the IEEE Micro Electro Mechanical Systems (MEMS)*, pp. 532-535, Miami, USA, Jan. 2005
10. W.C. Welch III and K. Najafi, "Transfer of Metal MEMS Packages Using a Wafer-Level Solder Sacrificial Layer," *Proceedings, 18th IEEE International Conference on Micro Electro Mechanical Systems (MEMS)*, pp. 584-587, Miami, USA, January 2005
11. J. Chae, J. Giachino, and K. Najafi, "Wafer-level Vacuum Package with Vertical Feedthroughs," *Proceedings, 18th IEEE International Conference on Micro Electro Mechanical Systems (MEMS)*, pp. 548-551, Miami, USA, January 2005

#### **E. RELATED PATENTS**

1. Navid Yazdi, and K. Najafi, "Microelectromechanical Capacitive Accelerometer and Method of Making Same," US Patent No. 6,035,714, issued on March 14, 2000
2. N. Yazdi, K. Najafi, "Single-Side Microelectromechanical Capacitive Accelerometer and Method of Making Same", US Patent No. 6,167,757, Issued January 2, 2001.
3. Liwei Lin, Yu-Ting Cheng, Khalil Najafi and Kensall Wise, "Process for Making Microstructures and Microstructures Made Thereby," US patent, No. 6,232,150, May 15, 2001.
4. N. Yazdi, K. Najafi, "Single-Side Microelectromechanical Capacitive Accelerometer and Method of Making Same", US Patent No. 6,402,968, June 11, 2002