

Curriculum Vitae

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Morris (Ming-Dou) Ker, Ph.D., IEEE FELLOW

CURRENT POSITIONS

(1) Distinguished Professor

Institute of Electronics, National Chiao-Tung University (NCTU),
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(2) Director

Biomedical Electronics Translational Research Center (BETRC),
National Chiao-Tung University (NCTU)
1001 University Road, Hsinchu, Taiwan.
<http://betrc.nctu.edu.tw/>

(3) Vice Chair

IEEE Taipei Section.
<http://www.ieee.org.tw/>

(4) President

Taiwan Engineering Medicine Biology Association (TWEMBA)
<http://www.twemba.org.tw/>

(5) Editor / Associate Editor

IEEE Transactions on Device and Materials Reliability
<http://eds.ieee.org/t-dmr.html>

IEEE Transactions on Biomedical Circuits and Systems
<http://iee-cas.org/pubs/tbiocas/editorial-board>

EDUCATION

Degrees / Year of Graduation/ Educational Institution/ Location

Ph.D., 1993, Institute of Electronics, National Chiao-Tung University, Taiwan.

Master, 1988, Institute of Electronics, National Chiao-Tung University, Taiwan.

Bachelors, 1986, Dept. of Electronics Engineering, National Chiao-Tung University, Taiwan.

PROFESSIONAL HISTORY

Employment

2010-now Distinguished Professor, National Chiao-Tung University (NCTU), Taiwan.

2011-now Director, Biomedical Electronics Translational Research Center, NCTU, Taiwan.

2012-2015 Dean of the College of Photonics, National Chiao-Tung University, Taiwan.

2011-2015 Executive Director of National Program on Nano Technology (NPNT), Taiwan.

- 2010-2011 Executive Director of the National Program on System-on-Chip (NSoC) , Taiwan.
- 2009-2010 Convener of the National Program on System-on-Chip (NSoC) , Taiwan.
- 2006-2008 Associate Director of the National Program on System-on-Chip (NSoC) , Taiwan.
- 2008-2011 Vice President, I-Shou University, Taiwan
- 2008-2011 Chair Professor, I-Shou University, Taiwan
- 2004-2009 Professor, Dept. of Electronics Engineering, National Chiao Tung University
- 2001-2004 Associate Professor, Dept. of Electronics Engineering, National Chiao Tung University
- 1999-2001 Assistant Professor, Dept. of Electronics Engineering, National Chiao Tung University
- 1997-1999 Department Manager, VLSI Design Division, Industrial Technology Research Institute (ITRI), Hsinchu, Taiwan.
- 1994-1997 Engineer/ Section Manager, Industrial Technology Research Institute (ITRI), Hsinchu, Taiwan.
- 1993-1994 Post-Doctor Researcher, National Chiao-Tung University, Taiwan.

ACADEMIC HONORS, AWARDS, AND SERVICES

1. Published over 500 technical papers in international journals and conferences. Most of them are in IEEE.
2. Granted with 233 U.S. patents and 212 Taiwan (R.O.C.) patents.
3. Funding President, Taiwan ESD Association, 2001 ~ 2005.
4. Top-Ten Outstanding Young Person in Taiwan, Junior Chamber International (JCI), 2003.
5. National Invention Award, Taiwan, 2005.
6. One of the Top-Ten Distinguished Inventors in Taiwan, 2009.
7. Associate Editor, *IEEE Trans. on VLSI Systems*, 2005 -2007.
8. Distinguished Lecturer, IEEE Circuits and Systems Society, 2006-2007.
9. Distinguished Lecturer, IEEE Electron Devices Society, 2008 ~ 2016.
10. *IEEE Fellow* (with the citation of “for contributions to electrostatic protection in integrated circuits, and performance optimization of VLSI micro-systems”), 2008.
11. Editor, *IEEE TRANSACTIONS ON DEVICE AND MATERIALS RELIABILITY*, 2012 ~ now.
12. Distinguished Technical Paper Award, *ISSCC* (IEEE International Solid-State Circuits Conference), 2013.
13. Award for Outstanding Science and Technology Contribution, the Executive Yuan, Taiwan Government, 2015.
14. Vice Chair, IEEE Taipei Section, 2017~.
15. Associate Editor, *IEEE TRANSACTIONS ON Biomedical Circuits and Systems*, 2018 ~ now.

16. Technical Program Committee and Session Chair of numerous international conferences of IEEE (including ISCAS, VLSI Symp., NEWCAS, SOCC, APCCAS, IRPS, IPFA, ...).

BRIEF BIOGRAPHY

Prof. Morris (Ming-Dou) Ker received the Ph.D. degree from National Chiao-Tung University (NCTU), Hsinchu, Taiwan. He ever worked as the Department Manager with the VLSI Design Division, Industrial Technology Research Institute (ITRI), Hsinchu, Taiwan. Since 2004, he has been a Full Professor in the Department of Electronics Engineering, NCTU, Hsinchu. During 2008 ~ 2011, he was rotated to be a Chair Professor and the Vice President of I-Shou University, Kaohsiung, Taiwan. During 2012 ~ 2015, he was the Dean of College of Photonics, NCTU, Tainan Campus, Taiwan. He ever served as the Executive Director of National Science and Technology Program on System-on-Chip (NSoC) in Taiwan during 2010 ~ 2011, and also served as the Executive Director of National Science and Technology Program on Nano Technology (NPNT) in Taiwan during 2011 ~ 2015. Now, he has been the Distinguished Professor in the Institute of Electronics, NCTU, and the Director of the *Biomedical Electronics Translational Research Center (BETRC)*, NCTU, working on the Biomedical Electronics Translational Research projects. In the technical field, he has published over 500 technical papers in international journals and conferences. He has proposed many solutions to improve the reliability and quality of integrated circuits and microelectronics systems, which have been granted with 233 U.S. patents and 212 Taiwan patents. His current research interests include reliability and quality design for circuits and systems, as well as the circuits and systems for implantable biomedical applications. Prof. Ker has served as member of the Technical Program Committee and the Session Chair of numerous international conferences. He ever served as the Associate Editor for the *IEEE Transactions on VLSI Systems*, 2006-2007. He was selected as the Distinguished Lecturer in the IEEE Circuits and Systems Society (2006–2007), and in the IEEE Electron Devices Society (2008–2016). Currently, he is serving as an Editor for *IEEE Transactions on Device and Materials Reliability*, and an Associate Editor for *IEEE TRANSACTIONS ON Biomedical Circuits and Systems*. Prof. Ker has been a Fellow of the *IEEE*, since 2008. In 2015, Prof. Ker received the Award for Outstanding Science and Technology Contribution, the Executive Yuan, Taiwan Government.

List of selected Publications on the topic of *Biomedical Circuits and Systems*:

(1) Referred Journal Papers:

- [1] Y.-L. Hsin, C. Cheng-Siu, S. Fu-Yuan, C.-H. Cheng, **Ming-Dou Ker**, and C.-Y. Wu, "Validation of a fully integrated closed-loop neuromodulation SoC with wireless power and bidirectional data telemetry for real-time seizure control: preliminary results from swine model," *Journal of the Neurological Sciences*, in press, 2018.
- [2] Z. Luo, **Ming-Dou Ker**, T.-Y. Yang, and W.-H. Cheng, "A digitally dynamic power supply technique for 16-channel 12V-tolerant stimulator realized in a 0.18- μm 1.8-V/3.3-V low-voltage CMOS process," *IEEE Trans. on Biomedical Circuits and Systems*, vol. 11, no. 5, pp. 1087-1096, Oct. 2017.
- [3] Z. Luo, **Ming-Dou Ker**, W.-H. Cheng, and T.-Y. Yen, "Regulated charge pump with new clocking scheme for smoothing the charging current in low voltage CMOS process," *IEEE Trans. on Circuits and Systems I: Regular Papers*, vol. 64, no. 3, pp. 528-536, Mar. 2017.
- [4] Z. Luo and **Ming-Dou Ker**, "A high-voltage-tolerant and precise charge-balanced neuro-stimulator in low voltage CMOS process," *IEEE Trans. on Biomedical Circuits and Systems*, vol. 10, no. 6, pp. 1087-1099, Dec. 2016.
- [5] S.-J. Peng, T. Harnod, J.-Z. Tsai, C.-C. Huang, **Ming-Dou Ker**, J.-C. Chiou, H. Chiueh, C.-Y. Wu, and Y.-L. Hsin, "Through diffusion tensor magnetic resonance imaging to evaluate the original properties of neural pathways of patients with partial seizures and secondary generalization by individual anatomic reference atlas," *BioMed Research International*, vol. 2014, May 2014.
- [6] C.-Y. Lin, Y.-J. Li, and **Ming-Dou Ker**, "Design of high-voltage-tolerant stimulus driver with adaptive loading consideration to suppress epileptic seizure in a 0.18- μm CMOS process," *International Journal of Analog Integrated Circuits and Signal Processing*, Springer US, vol. 79, no. 2, pp. 219-226, May 2014.
- [7] W.-M. Chen, H. Chiueh, T.-J. Chen, C.-L. Ho, C. Jeng, **Ming-Dou Ker**, C.-Y. Lin, Y.-C. Huang, C.-W. Chou, T.-Y. Fan, M.-S. Cheng, Y.-L. Hsin, S.-F. Liang, Y.-L. Wang, F.-Z. Shaw, Y.-H. Huang, C.-H. Yang, and C.-Y. Wu, "A fully integrated 8-channel closed-loop neural-prosthetic CMOS SoC for real-time epileptic seizure control," *IEEE Journal of Solid-State Circuits*, vol. 49, no. 1, pp. 232-247, Jan. 2014.
- [8] C.-Y. Lin, W.-L. Chen, and **Ming-Dou Ker**, "Implantable stimulator for epileptic seizure suppression with loading impedance adaptability," *IEEE Trans. on Biomedical Circuits and Systems*, vol. 7, no. 2, pp. 196-203, Apr. 2013.
- [9] C.-Y. Lin and **Ming-Dou Ker**, "Overview of on-chip stimulator designs for biomedical applications," *Journal of Neuroscience and Neuroengineering*, vol. 1, no. 2, pp. 204-212, Dec. 2012.
- [10] **Ming-Dou Ker**, C.-Y. Lin, and W.-L. Chen, "Stimulus driver for epilepsy seizure suppression with adaptive loading impedance," *Journal of Neural Engineering*, vol. 8, no. 6, Dec. 2011.

- [11] W.-J. Ho, J.-S. Chen, **Ming-Dou Ker**, T.-K. Wu, C.-Y. Wu, Y.-S. Yang, Y.-K. Li, and C.-J. Yuan, "Fabrication of a miniature CMOS-based optical biosensor," *Biosensors and Bioelectronics*, vol. 22, no. 12, pp. 3008-3013, Jun. 2007.
- [12] **Ming-Dou Ker**, S.-L. Chen, and C.-S. Tsai, "Overview and design of mixed-voltage I/O buffers with low-voltage thin-oxide CMOS transistors," *IEEE Trans. on Circuits and Systems I: Regular Papers*, vol. 53, no. 9, pp. 1934-1945, Sep. 2006.
- [13] **Ming-Dou Ker**, S.-L. Chen, and C.-S. Tsai, "Design of charge pump circuit with consideration of gate-oxide reliability in low-voltage CMOS processes," *IEEE Journal of Solid-State Circuits*, vol. 41, no. 5, pp. 1100-1107, May 2006.

(2) International Conference Papers:

- [1] C.-H. Cheng, P.-Y. Tsai, T.-Y. Yang, W.-H. Cheng, T.-Y. Yen, Z. Luo, X.-H. Qian, Z.-X. Chen, T.-H. Lin, W.-H. Chen, W.-M. Chen, S.-F. Liang, F.-Z. Shaw, C.-S. Chang, F.-Y. Shih, Y.-L. Hsin, C.-Y. Lee, **Ming-Dou Ker**, and C.-Y. Wu, "A fully integrated closed-loop neuromodulation SoC with wireless power and bi-directional data telemetry for real-time human epileptic seizure control," *Digest of Technical Papers, 2017 IEEE Symposium on VLSI Circuits*, Kyoto, Japan, Jun. 5-8, 2017, pp. C44-C45.
- [2] X.-H. Qian, Y.-C. Wu, T.-Y. Yang, C.-H. Cheng, H.-C. Chu, W.-H. Cheng, T.-Y. Yen, T.-H. Lin, Y.-J. Lin, Y.-C. Lee, J.-H. Chang, S.-T. Lin, S.-H. Li, T.-C. Wu, C.-C. Huang, C.-F. Lee, C.-H. Yang, C.-C. Hung, T.-S. Chi, C.-H. Liu, **Ming-Dou Ker**, and C.-Y. Wu, "A bone-guided cochlear implant CMOS microsystem preserving acoustic hearing," *Digest of Technical Papers, 2017 IEEE Symposium on VLSI Circuits*, Kyoto, Japan, Jun. 5-8, 2017, pp. C46-C47.
- [3] Z. Luo and **Ming-Dou Ker**, "Design of high-voltage-tolerant level shifter in low voltage CMOS process for neuro stimulator," *Proc. of IEEE International NEWCAS conference*, Vancouver, Canada, Jun. 26-29, 2016.
- [4] K.-Y. Lin, **Ming-Dou Ker**, and C.-Y. Lin, "A high-voltage-tolerant stimulator realized in the low-voltage CMOS process for cochlear implant," *Proc. of IEEE International Symposium on Circuits and Systems (ISCAS)*, Melbourne, Australia, Jun. 1-5, 2014, pp. 237-240.
- [5] W.-M. Chen, H. Chiueh, T.-J. Chen, C.-L. Ho, C. Jeng, S.-T. Chang, **Ming-Dou Ker**, C.-Y. Lin, Y.-C. Huang, C.-W. Chou, T.-Y. Fan, M.-S. Cheng, S.-F. Liang, T.-C. Chien, S.-Y. Wu, Y.-L. Wang, F.-Z. Shaw, Y.-H. Huang, C.-H. Yang, J.-C. Chiou, C.-W. Chang, L.-C. Chou, C.-Y. Wu, "A fully integrated 8-channel closed-loop neural-prosthetic SoC for real-time epileptic seizure control," *Technical Digest of IEEE International Solid-State Circuits Conference (ISSCC)*, San Francisco, CA, USA, Feb. 17- 21, 2013, pp. 286-287.
- [6] Y.-C. Huang, **Ming-Dou Ker**, and C.-Y. Lin, "Design of negative high voltage generator for biphasic stimulator with SoC integration consideration," *Proc. of IEEE Biomedical Circuits and Systems (BioCAS) Conference*, Hsinchu, Taiwan, Nov. 28-30, 2012, pp. 29-32.
- [7] **Ming-Dou Ker**, W.-L. Chen, and C.-Y. Lin, "Live Demonstration: Implantable stimulator for epileptic seizure suppression with loading impedance adaptability,"

Proc. of IEEE Biomedical Circuits and Systems (BioCAS) Conference, Hsinchu, Taiwan, Nov. 28-30, 2012, p. 78.

- [8] C.-Y. Wu, Y.-L. Hsin, S.-F. Liang, F.-Z. Shaw, J.-C. Chiou, **Ming-Dou Ker**, and H. Chiueh, "A neural prosthetic device with closed-loop epileptic seizure detection and conditional therapeutic stimulation," *Proc. of Neural Interfaces Conference (NIC)*, Salt Lake City, Utah, USA, Jun. 18-20, 2012, p. 255.
- [9] C.-Y. Lin, Y.-J. Li, Y.-C. Huang, and **Ming-Dou Ker**, "Design of high-voltage-tolerant stimulus driver for epileptic seizure suppression in a 0.18- μm CMOS process," *Proc. of Neural Interfaces Conference (NIC)*, Salt Lake City, Utah, USA, Jun. 18-20, 2012, p. 154.
- [10] C.-Y. Lin, Y.-J. Li, and **Ming-Dou Ker**, "High-voltage-tolerant stimulator with adaptive loading consideration for electronic epilepsy prosthetic SoC in a 0.18- μm CMOS process," *Proc. of 10th IEEE International NEWCAS Conference*, Montreal, Canada, Jun. 17-20, 2012, pp. 125-128.