

## Brief Resume - Krishnamachar Prasad

Name: Krishnamachar Prasad (Australian Citizen and **Overseas Citizen of India**)

Address: Department of Electrical & Electronic Engineering  
School of Engineering, Computing and Mathematical Sciences  
Auckland University of Technology (AUT)  
Private Bag 92006  
Auckland 1142

Contact Number: +64 9 921 9999 ext: 6229 Fax: +64 9 921 9973  
+64 21 933 858 (Mobile)

Email: kprasad@aut.ac.nz  
krishnamachar.prasad@ieee.org

Designation: Professor

### **Academic Qualifications**

- B.E, Bangalore University, Bangalore, India  
Major in Electronics
- M.Tech, Indian Institute of Technology, Madras, India  
Major in Semiconductor Physics and Devices
- Ph.D, University of Western Australia, Australia  
Thesis on the use of electron beam annealing for fabrication of III-V devices

### **Work Experience**

2011 – present	Professor, Department of Electrical and Electronic Engineering, AUT
2008 – 2010	Professor and Head, Department of Electrical and Electronic Engineering Associate Head, School of Engineering, AUT
2006 – 2007	Associate Professor, School of Engineering, AUT Program Leader, BE (Electrical and Electronic Engineering)
1992 – 2006	Lecturer, Senior Lecturer, Associate Professor, School of Electrical & Electronic Engineering, Nanyang Technological University, Singapore
1990 – 92	Research Fellow, Department of Electrical & Electronic Engineering The University of Western Australia, Perth, Australia
1987-90	Tutor and Demonstrator, Department of Electrical & Electronic Engineering, The University of Western Australia
1983-87	Research Assistant, Department of Electrical Engineering National University of Singapore, Singapore

### **Research Experience (30+ years)**

- Solid state sensors for odor, color and chemical profiling for (NZ) food and wine industry
- Use of high-temperature superconductors in transformers and rotating electrical machines
- Surface electromyography
- Renewable energy
- Electric vehicles
- Development of Cu metallization for DSICs
- Development of 3-dimensional interconnects
- Cu/low-k interconnect technology for DSICs
- Studies of Cu contamination effects on reliability of CMOS devices
- Reliability studies of different kinds of solid state devices and ICs as well as reliability modeling
- Development of process technology for Silicon ICs, III-V HEMTs, HBTs and MMICs
- Infra-red photo detectors on Mercury Cadmium Telluride

I have authored/co-authored 190+ papers (published and/or accepted) in diverse areas of microelectronics, materials science, sensors, electromyography and high-temperature superconductor applications in electrical machines in peer-reviewed international journals and conferences.

### **Postgraduate Supervision**

- 15 M.Sc (coursework + thesis), 4 M.Eng (thesis only), and 4 Ph.D completions
- 4 Ph.D supervisions currently in progress – one student has submitted thesis for examination and one more will be submitting it shortly.

### **Teaching Experience (30+ years)**

- Failure Mechanisms in Semiconductor Devices (post-graduate paper)
- Advanced Topics in Semiconductor Devices (post-graduate paper)
- Semiconductor Devices (final year BE paper)
- Semiconductor Process Engineering (final year BE paper)
- IC Yield and Reliability (final year BE paper)
- VLSI Circuits, Systems and Technology (final year BE paper)
- Electronic Systems (3<sup>rd</sup> year BE paper)
- Analog and Digital Electronics (2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year BE papers in various forms and titles and at appropriate levels)
- Electronic Materials and Devices (2<sup>nd</sup> year BE paper)
- Semiconductor Fundamentals (2<sup>nd</sup> year BE paper)
- Circuits (2<sup>nd</sup> year BE paper - AUT)
- Electronics (1<sup>st</sup> year BE foundation paper)
- Electrical Engineering Principles (1<sup>st</sup> year BE foundation paper)
- Electromagnetic field theory (2<sup>nd</sup> and 3<sup>rd</sup> year BE paper)
- Several undergraduate laboratories (AUT and elsewhere)
- Physics (from 1<sup>st</sup> year to higher years and also as a bridging subject to international students)
- Mathematics (from 1<sup>st</sup> year to higher years and also as a bridging subject to international students)

## Selected Publications

### In international journals

1. Ning Ding, **K. Prasad** and T.T. Lie, The electric vehicle: a review, *International Journal of Electric and Hybrid Vehicles*, **Vol. 9**, pp. 49-66, 2017.
2. J. Kilby, **K. Prasad** and G. Mawston, Multi-channel surface electromyography electrodes – a review, *IEEE Sensors Journal*, **Vol. 16**, pp. 5510-19, 2016.
3. P. Balasubramanian and **K. Prasad**, A fault tolerance improved majority voter for TMR system architectures, *WSEAS Transactions on Circuits and Systems*, **Vol. 15**, pp. 108-122, 2016.
4. P. Balasubramanian and **K. Prasad**, On deducing the clique potential of nanoscale combinational circuits, *Current Nanoscience*, **Vol. 9**, pp. 514-520, 2013.
5. M.A. Abdul Rahman, T.T. Lie and **K. Prasad**, Computation of the thermal effects on HTS transformer windings, *IEEE Transactions on Applied Superconductivity*, **Vol. 22**, 5501211 (11 pages), 2012.
6. F. Jiang, A. Keating, M. Martyniuk, **K. Prasad**, L. Faraone and J.M. Dell, Characterization of low-temperature bulk micromachining of silicon using an SF<sub>6</sub>/O<sub>2</sub> inductively coupled plasma, *Journal of Micromechanics and Microengineering*, **Vol. 22**, 095005 (10 pages), 2012.
7. N. Ranganathan, D.Y. Lee, L. Youhe, G.Q. Lo, **K. Prasad** and K.L. Pey, Influence of Bosch etch process on electrical isolation of TSV structures, *IEEE Transaction on Components, Packaging and Manufacturing Technology*, **Vol. 1**, 1497-1506, 2011.
8. N. Ranganathan, **K. Prasad**, N. Balasubramanian and K. L. Pey, Study of thermo-mechanical stress and its impact on through silicon vias, *Journal of Micromechanics and Microengineering*, **Vol. 18**, 075018 (13 pages), 2008.
9. Z.H. Gan, Zhong Chen, S.G. Mhaisalkar, Zhe Chen and **K. Prasad**, Effect of electron beam treatment on adhesion of Ta/polymeric low-*k* interface, *Applied Physics Letters*, **Vol. 88**, 233510, 2006.
10. H.S. Nguyen, Z.H. Gan, Zhe Chen, V. Chandrasekar, **K. Prasad**, S.G. Mhaisalkar and N. Jiang, Reliability studies of barrier layers for Cu/PAE low-*k* interconnects, *Microelectronics Reliability*, **Vol. 46**, pp. 1309-1314, 2006.
11. Z.H Gan, S.G. Mhaisalkar, Zhong Chen, Zhe Chen, **K. Prasad**, Sam Zhang and M. Damayanti, Modification of Ta/Polymeric Low-*k* Interface by Electron Beam Treatment, *J. Electrochem. Soc.*, **Vol. 153**, pp. G30-34, 2006.
12. Zhe Chen, **K. Prasad**, N. Jiang, L.J. Tang, P.W. Lu, and C.Y. Li, Silicon Carbide Based Dielectric Composites in Bilayer Sidewall Barrier for Cu/Porous Ultra Low-*k* interconnects, *J. Vac. Sci. Technol.*, **Vol. B23**, pp. 1866-1872, 2005.

13. Zhe Chen, **K. Prasad**, Z.H. Gan, S.Y. Wu, S.S. Mehta, N. Jiang, S.G. Mhaisalkar, Rakesh Kumar and C. Y. Li, Effect of in-line electron beam treatment on the electrical performance of Cu/organic low-*k* damascene interconnects, *IEEE Electron Device Letters*, **Vol. 26**, pp. 448-450, 2005.
14. Zhe Chen, **K. Prasad**, C.Y. Li, N. Jiang and D. Gui, Investigation of Dielectric/Metal Bilayer Sidewall Diffusion Barrier for Cu/Porous Ultra Low-*k* Interconnects, *IEEE Transactions on Device and Materials Reliability*, **Vol. 5**, pp. 133-141, 2005.

#### In international conferences

1. Ning Ding, **K. Prasad** and T.T. Lie, The design control strategy for blended series-parallel power split PHEV – a simulation study, *13<sup>th</sup> International Conference on Applications of Electrical Engineering (AEE'17)*, Berlin, Germany, March 31 – April 2 2017.
2. E. Bassey, P. Sallis and **K. Prasad**, Sensitivity Variation of Nanomaterial at Different Operating Temperature Conditions, *146<sup>th</sup> Annual Meeting and Exhibition of The Mineral, Metal and Materials Society (TMS 2017)*, San Diego, USA, Feb 26 – March 2 2017.
3. R. Kulkarni, **K. Prasad**, T.T. Lie, R.A. Badcock, C.W. Bumby and H.J. Sung, FEM and performance analysis of 10 kW HTS generator with flux pump excitation, *2016 IEEE International Conference on Power System Technology (POWERCON 2016)*, Wollongong, Australia, Sep 28 – Oct 1 2016.
4. J. Kilby, **K. Prasad** and G. Mawston, Design of multi-channel electrodes for surface electromyography signals, *38<sup>th</sup> Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC2016)*, Lake Buena Vista, USA, Aug 16-20 2016.
5. E. Bassey, P. Sallis and **K. Prasad**, Analysis of Methanol Sensitivity on SnO<sub>2</sub>-ZnO Nanocomposite, *145<sup>th</sup> Annual Meeting and Exhibition of The Mineral, Metal and Materials Society (TMS 2016)*, Nashville, USA, Feb 14-18 2016.
6. Ravichandra, **K. Prasad** and T.T. Lie, Flux pump for rotating machinery applications, *PowerTech, 2015 IEEE Eindhoven*, Eindhoven, Netherlands, June 29 – July 2 2015.
7. Hamid Gholam Hosseini and **K. Prasad**, Biotronic engineering curriculum design: integrating electronic engineering with applied/health sciences, *TALE 2013 – IEEE International Conference on Teaching, Assessment and Learning for Engineering*, Bali, Indonesia, August 26-29 2013.
8. P. Balasubramanian, D. Dhivyaa, J.P. Jayakirthika, P. Kaviyarasi and **K. Prasad**, Low power self-timed carry lookahead adders, *IEEE 56<sup>th</sup> Midwest Symposium on Circuits and Systems (MWSCAS 2103)*, Columbus, USA, August 4-7 2013.
9. M.A. Abdul Rahman, T.T. Lie and **K. Prasad**, Modelling of short-circuit and inrush currents of HTS transformer in distribution networks, *17<sup>th</sup> Power Systems Computation Conference (PSCC2011)*, Stockholm, Sweden, Aug 22-26 2011.
10. E.E. Bassey, P. Sallis and **K. Prasad**, Design of a chemical sensor for phenol characterisation in environmental systems, *Nanoscale Materials and Devices for Energy Conversion, Storage and Biosensors (Nanoenergy 11)*, Natal, Brazil, April 3-6 2011.

11. N. Raghavan and **K. Prasad**, Statistical outlook into the physics of failure for copper/low-k intrametal dielectric breakdown, *2009 IEEE International Reliability Physics Symposium (IRPS – 47<sup>th</sup> Annual)*, Montreal, Canada, April 26-30 2009.
12. David Soon Wee Ho, Seung Wook Yoon, Q.E. Zhou, **K. Prasad** and Vaidynathan Kripesh, High performance through silicon via (TSV) for High Frequency Applications, *58<sup>th</sup> Electronic Components and Technology Conference (ECTC)*, Lake Buena Vista, Florida, USA, May 27-May 30, 2008.
13. **K. Prasad**, Use of dielectric/metal sidewall diffusion barrier in Cu/porous ultra low-k interconnects, **INVITED PAPER**, *IMAPS India National Conference on Microelectronics and VLSI*, Mumbai, India., Dec 19-21 2005.
14. Zhe Chen, **K. Prasad**, N. Jiang, L.J. Tang, N. Babu, S. Balakumar and C.Y Li, Pseudo-breakdown Phenomenon and Barrier Integrity in Cu/Porous Ultra Low-k Damascene Interconnects, *2005 IEEE International Reliability Physics Symposium (IRPS – 43<sup>rd</sup> Annual)*, San Jose, USA, April 17-21 2005, pp. 478-482.
15. Chen Zhe, **K. Prasad**, N. Jiang, S.S. Su, P.W. Lu and C.Y. Li, Composite Dielectric/Metal Sidewall Barrier with Al Stuffing layer for Cu/Porous Ultra Low-k Damascene Interconnects, *Advanced Metallization Conference (AMC) 2004*, San Diego, USA, October 19-21 2004.
16. Chen Zhe, **K. Prasad**, C.Y. Li, P.W. Lu, S.S. Su and L.J. Tang, Highly Reliable Dielectric/Metal Bilayer Sidewall Diffusion Barrier in Cu/Porous Organic Ultra Low-k Interconnects, *2004 IEEE International Reliability Physics Symposium (IRPS - 42<sup>nd</sup> Annual)*, Phoenix, USA, April 25-29 2004, pp. 320-325.