Storage Class Memory:
Coming to a Datacenter Near You

Report No. FI-NVM-SCM-1115
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Dr. Li has authored and co-authored over 100 technical papers published in peer-reviewed journals and conferences and holds 71 granted U.S. patents. Her book “Nonvolatile Memory Design: Magnetic, Resistive, and Phase Changing” was published by CRC Press in 2011. Dr. Li received five best paper awards and five best paper nominations from ISQED, ISLPED, DATE, ISVLSI, ASPDAC, and ICCAD. She is the associate editor of TVLSI, TMSCS, and TODAES and has served as organization and technical program committee member for more than 20 international conference series. Dr. Li was the recipient of NSF CAREER award in 2012 and DARPA Young Faculty Award (YFA) in 2013.

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Stefan has published more than 50 technical papers in refereed journals and conferences, filed more than 15 U.S. patents and co-authored 2 book chapters.
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Greg earned his B.A.Sc. degree in Electrical Engineering from the University of Toronto, and his M.B.A. degree from the Richard Ivey School of Business in London, Ontario.
About NaMLab

NaMLab (Nano-electronic Materials Laboratory)

The research at NaMLab focuses on materials for electronic devices and new device concepts. Among these are high-k materials for capacitors, transistors and other applications, novel switching devices including memristors, nanowire based electronics as well as materials for energy harvesting devices such as solar cells.

Future nano-electronic products require the development of new materials that are not currently available. NaMLab consequently focuses its research activities on materials and applications that show the potential to offer significant advantages over materials and products used today. In addition to investigating and characterizing new materials, NaMLab is undertaking research on the integration of these materials into semiconductor products with nano-scale dimensions.

NaMLab, originally founded as a research joint venture between Qimonda AG and the TU Dresden in July 2006, has its roots in the Corporate Research Department of Infineon AG and is now owned completely by the Technical University of Dresden. NaMLab receives basic financing from the Saxon Ministry of Science and Arts (SMWK). The company benefits from excellent working conditions in its office and clean room building opened in October 2007 and located within the TU Dresden campus.

Characterization:
- physical characterization (conductive AFM, SSRM, SEM)
- electrical device characterization;
  - 200mm/300mm wafer probe stations
  - 80K – 500K temperature range
  - Analytical measurements of memory cells (lifetime, switch time, storage and deletion windows)
  - charge carrier mobility with Hall and split-C(U)
- optical characterization (FTIR ellipsometry, μRaman and photoluminescence)
- dielectric reliability (TDDB, BTI, SILC)
- high-k material development
  - oxides: AlO, TiO, ZrO, HfO and mixtures
  - metals: Al, Pt, Au, TiN, Ti, Ru
  - methods: ALD, MBE, PVD, evaporation

Development:
- materials for emerging memories
- high-k stacks for capacitors and transistors
- development of new memory concepts
- charge trap device development
- development of explorative devices based on silicon nano wires
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