

Shoaib Zaidi

Ag. Chair, Department of Electronic Engineering at NED University of Engineering & Technology, Karachi

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Summary

Proven record of achievement in development of semiconductor metrology processes, techniques and tools. Credited with five-fold improvement in performance of Shack-Hartmann based, wafer flatness sensor system (product subsequently won international awards). Pioneering work in scatterometry referenced by Chris Mack in PROLITH™ manual. Successfully demonstrated non-contact infrared based method for high aspect DRAM trench feature measurements.

Demonstrated successful operation of novel spectroscopic sensor for contamination. Owner of all key steps including conception and collaborative design, selection and procurement of components and sub-assemblies, bread-boarding and setup, experimentation and data collection.

As lead metrology engineer at joint IBM-Infineon DRAM development alliance, identified and developed solutions for metrology and process control requirements for manufacture of next-generation (110 nm and 90 nm DRAM) memory devices for implementation at six international semiconductor factories.

As tool owner of magnetic anneal furnace, successfully supervised numerous upgrades on alpha tool while minimizing detrimental impact on program. Achieved buy-in from operator team by communicating need, strategy and impact and by implementing their suggestions (team members won several employee of month awards). Performed a thorough analysis on methods of increasing capacity per run and reducing cycle time. Achieved goal ensuring accelerated turn around time (from 4+ days to < 1day) and increased throughput (50 % +). Managed vendor interaction and saved 1+ year maintenance contract costs.

Specialties

Optical metrology, sensor development, optical systems design and development, non-destructive and non-contact measurement methods, interferometer development and application, diffractive optics, spectroscopy, semiconductor process engineering and control, semiconductor material analysis, scatterometry.

Experience

Ag. Chair, Department of Electronic Engineering at NED University of Engineering & Technology, Karachi

April 2009 - Present (2 years 5 months)

Education.

Consultant at Abini International LLC.

February 2009 - Present (2 years 7 months)

- Higher education.
- Renewable energy.
- Energy conservation.

Senior Engineer at Qimonda

August 2007 - February 2009 (1 year 7 months)

- Development and implementation of metrology solutions to reduce cost, decrease cycle-time, improve yield and enhance profitability at 300 mm DRAM production facility for 90 nm, 80 nm and 65 nm nodes.
- Innovative implementation of data mining for fault detection and classification.
- Manufacturing viability evaluation of metrology toolsets and techniques for 58 nm production node.

1 recommendation available upon request

Senior Engineer R & D at Qimonda

August 2004 - July 2007 (3 years)

(prev. Infineon Technologies),

[Assignment @ IBM T J Watson Research Center]

- Senior process development engineer in Phase Change RAM (PCRAM) IBM-Infineon-Macronix joint development program.
- Early identification of a potential "show-stopper" (inadequate failure analysis capacity for sub 50 nm features). Evaluated potential solutions for quality, speed and cost. Provided clear roadmap of solution to management, achieved "buy-in" and implemented solution.
- Metrology support for lithography and etch teams in development of sub-lithographic (sub 50 nm) features using LEO SEMs, KLA-Tencor F5 ellipsometers, Tencor P11 profilometers, Digital Instruments AFM, n&k reflectometers and variety of other tools.
- Characterization of phase change (chalcogenide) materials. Directed and coordinated TEM, STEM and SEM analysis. XPS analysis of etched surfaces to study effects of chemistries on selective depletion.

1 recommendation available upon request

Senior Engineer R & D at Infineon Technologies

May 2002 - July 2004 (2 years 3 months)

[Assignment @ IBM T J Watson Research Center]

- Senior process development engineer in Magnetic RAM (MRAM) IBM-Infineon joint development program.

- Technical lead on magnetic annealing and tool owner.
- Managed team of technicians and logistics for efficient wafer flow.
- Eliminated bottleneck by achieving 50 % increase in wafer throughput.
- Characterized MRAM (magnetic RAM) samples using customized conducting AFM tool.

Engineer / Senior Engineer at Infineon Technologies

2000 - 2003 (3 years)

[Assignment at IBM Advanced Semiconductor Technology Center]

- Determined metrology requirements for next generation DRAM development at semiconductor pilot production facility in a joint IFX– IBM program.
- Implemented innovative FTIR based methods for deep feature measurements which were beyond the capabilities of AFMs and other non-destructive techniques. Our FTIR based solution which is both faster than cross section SEMs and also non-destructive, resulted in significant cost savings and due to more frequent sampling, provided improved process control.
- Served as IFX representative to the Metrology Program Advisory Group at International Sematech. Member of International Technology Roadmap for Semiconductors (ITRS) defect reduction US Domestic Technical Working Group.
- Participated in strategic decisions concerning capital expenditure planning and allocation. Alerted management to future problems with a key supplier, identified and proposed alternative solutions.

Senior Research Engineer/Post Doctoral Fellow at Center for High Technology Materials, University of New Mexico

March 1998 - June 2000 (2 years 4 months)

1. Wavefront Sciences Incorporated

- Credited with five-fold improvement in performance of tool that led to commercial viability. Tool awarded 2001 Photonics Circle of Excellence from Photonics Spectra Magazine and R&D 100 award

(<http://www.rdmag.com/ShowPR.aspx?PUBCODE=014&ACCT=1400000100&ISSUE=0209&RELTYPE=P>)

- Developed and implemented software algorithms for nanotopology sensor for silicon wafers.

2. Sandia National Laboratories

- Designed, planned and constructed a spectroscopic sensor in collaboration with a team of scientists from Sandia National Laboratories and The University of Washington, Seattle.
- Responsible for selection and assembly of all components and fabrication of the system.
- Conducted experiments to evaluate the performance of the sensor.
- Demonstrated sub 50 parts per billions detection of organic contaminants in water.

1 recommendation available upon request

Senior Lecturer at GIK Institute of Engineering Sciences and Technology

January 1997 - July 1997 (7 months)

Developed and taught undergraduate courses for a new curriculum.

Designed and taught a laboratory course.

Optical Engineer at Fresnel Optics Inc., Rochester, NY.

June 1989 - August 1989 (3 months)

- Led project that designed and developed a facet-angle measuring system for Fresnel solar concentrators for EPRI / NREL.
 - Evaluated and recommended new software and hardware for Fresnel, installed most of the new computer products.
 - Wrote software for design and performed computer simulations.
 - Compared and evaluated competitors' products with Fresnel's products.
 - Tested design limits and recommended improvements in design of products.
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Education

The University of New Mexico

Ph.D., Applied optics, semiconductor metrology, 1992 - 1997

The University of Texas at Dallas

MSEE, Applied Optics, 1990 - 1992

University of Rochester

BS, Optical Engineering, 1988 - 1990

The College of Wooster

BA, Physics (minor in mathematics), 1985 - 1990

Activities and Societies: Crandall House: Vice President and Social Chair

Aitchison College

HSc. O & A levels, 1981 - 1984

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3 people have recommended Shoaib

"Shoaib is a very knowledgeable engineer on materials and materials characterization. He also provided excellent customer service when dealing with hot issues requiring immediate attention as well as long working hours in order to keep the line working. As part of his work he successfully implemented several methods for stabilization of the XRF measurement instrument, leading to significant improvement on the tool performance assisting in reducing the failure rate of dopant measurement for BPSG films. His work and dedication are greatly appreciated."

— **Sebastian F.**, *Senior Process Engineer, Qimonda*, worked with Shoaib at Qimonda

"Shoaib is innovative, thorough, and has excellent knowledge of optics, metrology, and semiconductor technology. He is committed, farsighted, and works well with business partners, coworkers, and management."

— **Thomas Happ**, *Senior Engineer, IBM Research*, worked directly with Shoaib at Qimonda

"Shoaib is exemplary when it comes to organizational leadership activities. Several times I've been fortunate to cross paths with Shoaib and observe his academic research with applied optics. He understands how to organize his group resources to create the highest quality output and productivity. The sheer amount of research was outstanding and worthy of recognition. Quite clearly, he knows how to get things done and done well. I highly recommend Shoaib's work and would consider it very advantageous to have him in your organization."

— **Nathan Geryk**, *Student, The University of New Mexico*, worked with Shoaib at Center for High Technology Materials, University of New Mexico

[Contact Shoaib on LinkedIn](#)