

**EDUCATION****Doctoral Studies in Materials Science and Engineering**

May 2005

Virginia Polytechnic Institute and State University (VPI&amp;SU), Blacksburg, VA

- GPA 3.93 on 4.0 scale
- *Laboratory development:* Expanded characterization facilities at VTabc and MicrON.
- *Designed layout and integrated components* for custom spectroscopy systems:
  - Raman spectroscopy of serum, cryogenic and fiber optic photoluminescence, photo-pumped laser gain, and LED characterization.
- *Installed & debugged semiconductor systems:*
  - I-V & C-V, Hall mobility, DLTS, & carrier profiling.
- *Restored and upgraded systems:* semiconductor parameter analysis, ferroelectric hysteresis, and UV-IR reflection-transmission spectroscopy.
- *Coordinated the specifications and purchase* of over \$200,000 in optical components.
- *Areas of study:* Quantum dot synthesis, heterostructure bipolar transistor design, wide band-gap GaN semiconductors, power amplifiers, finite element analysis using SILVACO, and optical gain in semiconductor lasers.
- *Teaching experience:* Taught labs for three courses in solid state materials & devices.
  - Developed new experiments on superconductivity, absorption in GaAs, & conductivity in doped Ge. Rewrote the lab manual as a web site.
- *Mentored 10 graduate students* in experiment design and interpretation as the *de facto* lab manager.

**Master of Science in Materials Science and Engineering**

August 1997

VPI&SU Funded by ORISE AIM Fellowship

- GPA 3.95 on 4.0 scale
- *Areas of study:* Semiconductor processing & performance, memory & logic devices, thin films, VLSI design using CADENCE, solid state physics, photodetectors, mathematical modeling.
- *Summer Internship:* Studied cross-sectional TEM at Oak Ridge National Labs.
- Developed systematic techniques to analyze microstructure, composition, and substrate reactions in  $\text{SrBi}_2\text{Ta}_2\text{O}_9$  and other ferroelectric films.
- Designed and built: Flash annealer, toxic vacuum exhaust network, spectroscopic photoconductivity system, and pyroelectric test station.
- Repaired and maintained metal deposition systems: Electron beam evaporator & DC sputterer.
- Gained expertise in investigative microscopy: TEM, SEM, AFM, SAM, VASE, & EDAX.
- Analyzed films made by metal-organic deposition (MOD), spin-coating, pulsed laser ablation, chemical vapor decomposition (CVD), reactive thermal oxidation, and rapid thermal annealing.
- Coordinated teams of international researchers for system development.

**Bachelor of Science with Honors in Materials Science and Engineering**      May 1995

- GPA 3.75 on 4.0 scale      (VPI&SU) Graduated *Magna Cum Laude*
- Put myself through undergraduate school with scholarships and lab jobs.
- *Team projects:* Fiber-optic polymerization sensor, monitor for carbon fiber distribution, superconductors for high magnetic field applications.
- *Optics Technician:* (1993–94) Wrote ellipsometry training manual and characterized thin films.

**Bachelor of Fine Arts in Studio Arts**      University of Colorado, Boulder      Dec. 1985

- GPA 3.45 on 4.0 scale      Regent's Scholar 1981, 1982      Dean's Scholarship 1981  
Talent & Creativity Scholarship 1985

## **EXPERIENCE**

**Engineering Services Leader, Missionary**      1998 – 1999

Mennonite Central Committee, Dhaka, Bangladesh

- Coordinated papermaking R&D in a third-world, bilingual setting for a relief agency.
- Directed an engineering staff of 9 expatriates and Bangladeshis serving 500 employees.
- Improved worker safety, productivity, and earnings for widows:
  - Pushed safe dye processes from concept to factory use in 6 months.
  - Doubled the energy efficiency of paper pulp digestion and beating processes.
- Designed pilot plant facilities using AUTOCAD to increase research efficiency.
- Motivated our team with praise and training incentives based on performance.
- Wrote grant proposals, annual budgets, progress reports, and contracts.
- Negotiated post flood reconstruction of 180 homes for \$50,000.

**Materials Technologist**

1990 – 1992

Cordec Corporation, Lorton, VA

- Evaluated composite quality using metallography, SEM, and tensile analysis.
- Co-authored reports to NASA on composite tubes, honeycombs, and intermetallics.
- Improved metal-matrix panel manufacturing by creating devices, including:
  - Fiber tension controller: Boosted tensile strength from 85 to 133 ksi.
  - Tube sample polisher: Reduced grinding time from 960 to 2 minutes.
  - Streamlined plasma sprayer: Lengthened coating runs from 300 to 4000 feet.
- Reconstructed a superconducting test vacuum system operating at 12 degrees Kelvin.
- Eliminated thermal buckling and reduced modulus variability in Cu-C panels.
- Mathematically related plasma penetration to fiber distribution and tension.

**Technical Language Instructor**

1987 – 1988

Mito English Center, Mito, Japan

- Strengthened oral presentation skills of engineers. Edited scientific papers.

**Freelance Painter**

1985 – 1990

Dickerson Studio, Colorado, Virginia, and Japan

- Solo exhibitions included "Living Water" at the National Arboretum, Wash. DC.
- Designed space-saving easels. Taught painting classes. Painted portraits and landscapes.

## SCHOLARSHIPS AT VPI&SU

VPI&SU MSE Department	Clevinger Scholarship	2003
VPI&SU Graduate School	Cunningham Fellowship	1995, 2000–02
VPI&SU MSE Department	Pratt Add-On Stipend	1997
DOE ORISE	Advanced Industrial Materials Fellowship	1995–1997
TMS	Light Metals Scholarships	1994, 1995
TMS	Extraction & Processing Scholarship	1994
U.S. Army	Testing & Evaluation Scholarship	1994
SAMPE	Undergraduate Engineering Scholarship	1994
WAAIME	Undergraduate & Graduate Scholarships	1994, 1995
TMS	Superalloys Scholarship	1993
ASM	Undergraduate Scholarship	1993

## PUBLICATIONS

B. D. Dickerson, D. M. Irving, E. Herz, R. O. Claus, W. B. Spillman Jr., and K. E.

Meissner. Synthesis Kinetics of CdSe Quantum Dots in Trioctylphosphine Oxide and in Stearic Acid. *Applied Physics Letters*. vol. 86. no. 18, in press, 076518, 2 May (2005).

B. D. Dickerson, D. M. Irving, E. Herz, K. E. Meissner, R. O. Claus, and W. B. Spillman Jr.. Arrhenius Growth of CdSe Quantum Dots in Stearic Acid. *Proceedings of Optics in the Southeast*. OISE 2004. Charlotte, NC, p. 69.

Bryan D. Dickerson, Bradley J. Heath, Louis J. Guido, Kevin S. Stevens, Charles R.

Lutz, Eric M. Rehder, and Roger E. Welser. "GaInP/GaInAsN/GaAs N-p-N Bipolar Transistors: Influence of Base Layer Composition and Alloy Grading on Device Performance." GaAs Mantek Conference -Technical Digest, 2003, May 19–22. Paper #11.4. Scottsdale, Arizona.

F. G. Arregui, B. Dickerson, R. O. Claus, I. R. Matias, and K. L. Cooper. "Polymer Thin Films of Controlled Complex Refractive Index Formed by the Electrostatic Self-Assembled Monolayer Process." IEEE Photonics Technology Letters. Vol. 13, No. 12. Dec. 2001. pp. 1319–21. IEEE, USA.

B. D. Dickerson, M. Nagata, Y. Song, H. D. Nam, and S. B. Desu. "Spectroscopic Ellipsometry Characterization of  $\text{La}_2\text{Ti}_2\text{O}_7$  Thin Films." Ferroelectric Thin Films IV. Materials Research Society Symposium. 1995, Volume 361, pp. 197–202, Pittsburgh, PA.

W. Tao, S. B. Desu, C. H. Peng, B. D. Dickerson, T. K. Li, C. L. Thio, J. J. Lee, and W. Hendricks. "Liquid Delivery CVD of Ferroelectric  $(\text{Pb},\text{La})(\text{Zr},\text{Ti})\text{O}_3$  Thin Films." Ferroelectric Thin Films IV, Materials Research Society Symposium, 1995, Volume 361, pp. 319–24, Pittsburgh, PA.