

## PROFESSIONAL SUMMARY

Leader of continuous improvement and big-data statistical analysis. Experienced in design, deposition, metrology, characterization and reliability-testing of silicon and polymer based films ranging from 5 nm to 100s of microns for use in optics and multilayer devices including photovoltaics, photonics, anti-corrosion, diffusion barrier, and electronics encapsulation. Developed prototype film-deposition, self-assembly techniques, curing and measurement devices resulting in 4 Patents and ~25 refereed publications, and citations in at least 7 published technical books. Developed several types of devices from design through high-volume. Collaborated across all functionalities & levels, domestic & overseas for prototyping through application and integration.

## PROFESSIONAL EXPERIENCE:

### **Project Manager, Continuous Improvement, Compass Manufacturing Services (2016 – Present)**

- Leading Continuous Improvement & Data Analysis Projects for all divisions across the enterprise
- Developing & Teaching Business Intelligence & sewing into the fabric of the corporate enterprise
- Business Analytics and Improvement using JMP13, PowerBI, Smartsheet, VBA, Power Query, M, DAX
- Corporate Safety Administration, Site Safety Coordination, ERT Team Leader & Evacuation Coordinator

### **Continuous Improvement Engineer & Lean Leader, Compass Manufacturing Services (2016)**

- Running the Kaizen Program across the entire organization
- Leading Continuous Improvement Teams along with related Company and Executive meetings
- Implementing Processes and Procedures in compliance with ISO 9001
- Administering the Safety Program and Keeping the organization compliant with Cal-OSHA standards.
- Building the Data Analysis construct across several factories, via Epicor, Power BI, M and DAX

### **Sr. Process Development Engineer, Roll-Coating, Advenira Enterprises, Sunnyvale California (2014-2015)**

- Complete Characterization and Re-Design of Prototype Gravure Roll-Coating System
  - Statistical Analysis and DOE using JMP, design using Solid Works
  - Silicon-based nanocomposite coatings
- Complete Characterization and Re-Build of 600 °C IR cure oven for silicon films on glass substrates
- Certified on Sono-Tek Flexicoat Shaped-Atomization spray-coating system
- Multi-layer optical, diffusion barrier, anti-corrosion film fabrication @ 30-150 nm per layer

### **Crystallization and Prototyping Expert, Cryscade Solar, Menlo Park, California (2014)**

#### **Solar Startup Company for Cascade Crystallization: 3<sup>rd</sup> Generation Organic Solar Cells**

- Device Prototyping and Film Fabrication to form vertical columns of Donor-Bridge-Acceptor (DBA) molecules for high-efficiency (30+%) So

### **Staff Process Development Engineer IV, Enki Technology, San Jose, California (2012 - 2013)**

#### **Solar Startup Company for CleanARC™ technology: self-cleaning, abrasion-resistant AntiReflection Coatings**

- Designed and developed prototype and full-scale Air-Knife curing machine and process, resulting in ability to fabricate top-tier AR coatings with industry top-tier physical robustness, while maintaining anti-soiling ability and without harming temperature-sensitive CdTe solar panels  
**U.S Patent 8,960,123 B2, International Patent Pend. PCT/US2014/015167**
- Designed the Flow-Coating system & Optimized the chemical delivery and atmospheric systems in a factory-scale automation framework for 1x2-meter defect-free AR films. **U.S. Patent 8,668,960**
- Optimized entire process, from chemistry modification through cure optimization, balancing Anti-Reflective, Abrasion Resistance, Anti-Soiling and Self-Cleaning Properties of Transparent Coatings for Glass Substrates and Solar Cells. **U.S. Patent Pend. 61/794,735**
- Defect / Structure Analysis of Sol-Gel Films: Ellipsometry, Reflectometry, Spectrophotometry
  - Developed metrology algorithms for ARC characterization using Handheld KM Reflectometer
  - Utilized Outsourced inspection for Defect Improvement / Morphology control via SEM, AFM, SIMS

**Process Design Engineering Manager, Philips Lumileds, San Jose, California (2011 - 2012)****Product Utilization and Yield: InGaN & AlInGaP LEDs from substrate through package assembly**

- Managed Global Product Engineering & Utilization team to optimize Yield, Defect-Reduction, Cost-Reduction and Forecasting Improvement using Citrix DataPower, Virtual SpotFire, JMP
  - 3 direct reports + 3 indirect reports: Product and Software Engineers in US, Singapore and Penang
- Coordinated with epi, Phosphor, Packaging, Sales Development, Product & Strategic Marketing
- Lead Inventory Reduction Team, including Sales Development, Supply Chain, Marketing
  - **50% Decrease** in Inventory as a function of Sales
  - **20% Increase** in Delivery Reliability Metric
- Instituted Margin & Incremental Cost-based metrics for Product & Strategic Marketing
  - Manage the Inventory rather than  $V_f$ , Color, Flux parameter distributions in factory

**Staff Product Development Engineer III, Tyco Electronics, Menlo Park, California (2006 - 2009)****Global Project Manager & Team Leader for: Surface Mount, Automotive, Battery, Bimetal**

- Expert contact for Field Applications Engineering, QA & Customer's Engineers for Asia and East Coast
- Lean Design for Six Sigma Green Belt trained - Statistical Analysis via JMP and Minitab
- Lead Failure Analysis and Accelerated Testing Teams and Projects for FMEA, DFM, APQP, QC
  - AC/DC Stress, High-Voltage Withstand, Temperature/Humidity, Highly-Accelerated Life Test (HALT), Thermal Cycling, Thermal Shock, Vibration Testing
  - PCB and IC component Fracture and Thermal Analysis via Micro Cross-Sectioning, Polarized Optical Microscopy, FLIR, X-Ray
  - Custom Circuit Failure Analysis using Electrometers, Lock-in Amplifiers, Oscilloscope, etc.
  - UL, RoHS, JEDEC, Mil-Spec compliance and certified testing
  - AEC committee member for ESD protection and Tin Whisker mitigation
- Developed prototype 3-layer surface-mount PPTC (Polymer Positive Temperature Coefficient) self-resetting fuses for circuit protection. Full responsibility from Design to FMEA and UL qualification to full-scale production, including modifying lithography processes, introducing slice and dice singulation process, modifying conducting polymer composite material formulations and developing new lamination techniques for the PPTC-metal layers adhesion
  - **\$25M+ Revenue** from miniSMD, microSMD, nanoSMD Surface Mount product launches
- Developed conformal coatings formulation for multi-layer PPTC devices, which afforded the ability for the PPTC devices to constantly expand-contract while maintaining hermetic seal without the ingress of small molecules into the PPTC material, typical of most conformal coatings
- Developed novel PPTC formulation for Lithium AA/AAA battery protection to withstand the pressure and physical confinement of a crimped mount, which typically resulted in catastrophic failure of PPTC material
  - **Sole-Source victory:** In collaboration with the battery manufacturer, developed a material that afforded over-current protection, with sufficient pliancy to withstand the pressure during expansion
- Lead global Engineering effort for successful introduction of Bimetal technology
  - Designed bimetal qualification laboratory and equipment for performance qualification, based the final performance requirements in a new market sector, and transferred to vendors for private-label
  - **\$12M Revenue** second year; **\$4M** first year; Record New Family Launch Time (<6 month)
- Designed and qualified prototype hybrid device for Lithium-ion battery pack thermal protection: PPTC in parallel with bimetal to mitigate bimetal's characteristic, catastrophic arc during activation / deactivation
- Created and Implement New Product Introduction methods for leadless surface mount devices
  - **45% Reduction in NPI Transfer Time from Development to Production**
- Created and championed a Quality Improvement Initiative throughout the focus factory
  - **20% Reduction** in Quality Events
- Managed and Created corporate-level JEDEC Tin Whisker certification program for RoHS
  - **\$70M+ Revenue** loss prevention for 3 Product Families by averting 6-month down-time
- Managed and Invented global, multifunctional, Strategic Execution Acceleration Program
  - **20% Reduction** in Project Completion Time; **800% Increase** in On-Time Delivery of Projects

**Senior Process Development Engineer III, Intel Corporation, Hillsboro, Oregon (2004 - 2005)**

**Lithography Development Engineer: Polysilicon Transistor Gate Layer Owner, Process Development Fab**

- Defect Inspection and Quality Control for entire front-end processes
  - CD-SEM, SEM, Opti-Probe CD, Polarized Microscopy, Overlay Inspection
- Maintained dimensional control of sub-40 nm polysilicon transistor gates using alternate phase shift mask (APSM) 193-nm lithography in a 300-mm ramp and development fab using SPC
- Maintained sub-micron alignment in Nikon and ASML lithography scanners
- Performed root cause analysis and 6-sigma statistical analysis, Green Belt trained, using JMP 5.1

**Research Scientist, Virginia Tech Physics Dept, Blacksburg, VA (1997-2004)**

**Fabrication and Characterization of Thin-Film LEDs, Photo Diodes, Electrochromics, Optical Modulators**

- Developed PV, EO and LED device prototyping methodology for organic polymer films with low temperature withstand, using ITO microscope slides. Coordinated with Luna Innovations for optimization of back-side metallization without harming the organic films
- Designed Laser / Optical system for Second Harmonic Generation measurements
- Designed a Dip-Coating process for Organic, Electrostatically Self-Assembled (ESA) Thin Films
- Developed methodologies and chemistries for tunable ESA deposition of noncentrosymmetric chromophores that maintain polar orientation necessary for electro-optic effect
- Developed hybrid ESA films using chromophores with ionic and covalent functionalities, affording improved chromophore orientation and film thickness for an electro-optic coefficient near LiNb crystals
- Invented a prototype photodiode characterization apparatus, using Xenon light, chopper, monochromator and lock-in amplifier, for characterization of prototype photovoltaic devices
- Invented a prototype polarization-controllable spectrophotometer for high-temperature device characterization of NLO films that undergo *trans-to-cis* isomerization of chromophore azo-linkage, and dipole orientation change, using Xenon lamp with monochromator, chopper, CAMAC gate-control system, and C++ interface programming
- Developed automated micro-positioning and data acquisition system for 1"x2" prototype devices using C++
- Programmed Data Extraction & Analysis Algorithms via Mathematica and C++ for surface mapping and internal structure determination of orientation-dependent responses of photonic films

**Non-Destructive Testing Engineer, Framatome Nuclear Services, Lynchburg, Virginia (1990-1993)**

**Quality Assurance / Nuclear Regulatory Commission Compliance**

- Quality Control and leak management of steam generator tubing for nuclear power plant operation
  - Assured NRC compliance for Occupational and Nuclear System Safety
- Defect Determination including Stress-Corrosion Cracking, Intergranular Attack, Fatigue Cracking
- Operated and assisted Development of multi-wrist Manipulator Robotics for Inspection and Repair
- Performed remote Robotic Acquisition, Shot-Peening, Pressure-Welding, Blast-Welding, MIG welding
- Certified in Radiation Environment Safety at numerous Nuclear Facilities
- Certified ET Level II: *American Society for Non-Destructive Testing* SNT-TC-1A
- Certified ET Level I: *Canadian General Standards Board* CAN/CGSB-48.9712

**Military: 82<sup>nd</sup> Airborne Division, U. S. Army, Fort Bragg, North Carolina**

**Squad Leader, 2/505<sup>th</sup> Parachute Infantry Regiment**

- Specialized in Airfield Seizure and Hostage Rescue
- Management, Leadership and Training of 9-person combat team
- Graduated with honors (Commandant's List) from Primary Leadership Development Course
- Accelerated promotion to Sergeant due to exemplary service
- Recalled into active duty for Special Operations Team in Operation Desert Storm

**EDUCATION: Ph. D. Macromolecular Science & Engineering (Physics), July 2004**

Nonlinear Optics, Adhesion, Device Physics  
Virginia Polytechnic Institute & State University

**M. S. Materials Science & Engineering, May 2002**

Device Physics, Polymer Morphology, Photonics  
Virginia Polytechnic Institute & State University

**B. S. Physics, May 1999**

Minor in Mathematics, Emphasis in Computer Science  
Virginia Polytechnic Institute & State University

- HONORS:**
- *Sigma Pi Sigma* Honor Society of the American Institute of Physics (1999)
  - *Phi Theta Kappa* Honor Society (1996)
  - Lubna Ijaz Scholarship for Commitment and Service to Physics (1998)

**33 Publications & Presentations, refereed:****RELATIVE COURSES & PROFICIENCIES:****Management & Marketing Courses, certified:**

Situational Leadership II, Performance Management, Presenting to Executives, Advanced Product Life Cycle, Strategic Selling, Marketing Best Practices, Red Team, PICOS, Project Management Fundamentals, Leading Global and Virtual Teams, Leading Change, Essentials of Business Leadership, Business Negotiations, Managing Internal Dynamics in a Cross-Functional Team, Product Management Fundamentals, Operations Management: Product and Service Management

**Technical Courses, certified or accredited:**

LED Fundamentals, InGaN LED Process Fundamentals, AlInGaP LED Process Fundamentals, Advanced Optical Signal Analysis and Discrimination, Applications Engineering - AOI + Automation, Hybrid Hard Disk Drive Technology, Six-Sigma Process Green Belt, Lean Design for Six Sigma Green Belt, Statistical Process Control, DOE, Statistical Mechanics, Adhesion Science, Polymer Viscoelasticity, Polymer Fracture and Deformation, Macromolecular Synthesis and Characterization, Solid State Physics, X-Ray Diffraction, Mechanical Behavior of Materials, Advanced Materials Thermodynamics, Nonlinear Optics, Quantum Electronics, Quantum Mechanics, Electrodynamics

**University Physics Instructing Experience:**

*Senior Optics Laboratory; Junior Electronics Laboratory; Quantum and Solid State Physics; Astrophysics; Electricity and Magnetism Laboratory; Mechanics Laboratory*

**Equipment Proficiency:**

- Hitachi S-9300 & S-9380 CD Measurement SEMs, Applied Materials SEMVision cX, Opti-Probe Thermo-Wave 5341 Optical CD Measurement Tool, Nikon Optistation-7 Microscopic Inspection Tool, KLA Tencor Archer 10 & 10XT Overlay Inspection Tools, Xyratex XSI & XAI & X-Disk & XI 100 AOI
- Nikon NSR S306C & S307E Lithography Scanners, ASML AT1200 Twinscan Lithography Scanner, TEL CleanTrack ACT12 & Lithius Lithography Tracks
- Nd:YAG laser systems, Spectrometers, Spectrophotometers, Pyrometers, Electrometers, Lock-in amplifiers, Oscilloscopes, Ellipsometers, DMA, DTMA, Instron Machines, Vacuum deposition systems, Spin coating systems, Geometric Optical System Design

**Software, Database, and Programming Language Proficiency:**

- JMP, Minitab, Tableau, Power BI, Power Query, M, DAX
- Citrix DataPower, Virtual SpotFire, Crystal Ball, Klarity, SciFinder, SAP, MIS, JIRA
- SPC, Mathematica, Origin, Psi Plot, Table Curve2D, Jasco Spectra Manager, ChemDraw
- MS Office 2010: Excel, Word, PowerPoint, Visio, Access, Sharepoint; CorelDraw X3
- C, C++, UNIX, HTML, BASIC, PHP, CSS, MySQL, M, DAX