

Overview

Going forward, I would like to transfer my semiconductor/data knowledge to additive manufacturing, gene therapy, artificial intelligence, or applied neuroscience themes.

Given the privilege, my degrees in Chemical Engineering and Physical Chemistry, along with a solid research background in Materials Science, provide ample experience to perform the duties required in the marketplace. A majority of semiconductor projects I encountered, involved either processing or characterization, so I am strong in both areas.

With over 20 years as a Research Scientist, I have coauthored roughly 16 papers, half under the direction of John Haggerty at MIT, and the remainder with support from Klaus Bachmann at NC State. During the course of research, I have: (1) grown the first laser-induced, chemical vapor deposition, amorphous silicon solar cells, (2) developed a microwave plasma, chemical vapor deposition system, to create polycrystalline diamond from methane gas, in a regime where kinetics dominates over thermodynamics, (3) monitored the surface evolution of compound semiconductor heterostructure films, in a chemical beam epitaxy system, with plane polarized reflectance spectroscopy, pioneered by our research group.

In more recent years, I plunged into the world of macroeconomics, human behavior, and statistical analysis, through futures trading. Using quantitative investment strategies, participants seek high probability trades. To handle market data, I applied digital signal processing techniques, in the spirit of John Ehlers, an Electrical Engineer from Raytheon. Along the way, I combined statistics with digital signal processing to produce highly responsive indicators, enhancing trade signal clarity. By immersing myself in the data science of financial markets, and backtesting of trading strategies, I have improved my computer programming skills, and established more techniques to deal with data interpretation.

Going forward, I would like to transfer my semiconductor/data knowledge to additive manufacturing, gene therapy, artificial intelligence, or applied neuroscience themes. I invite you to visit my personal website to view current literature and computational projects. If you have any concerns, feel free to contact me.

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Profile

Chemical Engineer seeking a Process Engineer, Quality Engineer, Application Engineer, or Data Scientist role, leading to a Chief Technology Officer position:

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|---------------------------|--------------------------|----------------------|
| crystal growth | plasma chemistry | gene therapy |
| surface science | laser excitation | applied neuroscience |
| chemical vapor deposition | optical characterization | computer modeling |
| molecular beam epitaxy | electrochemical methods | statistical analysis |
| semiconductor devices | additive manufacturing | process control |

Thesis

Real Time Reflectometry of Ga-based Compound Semiconductor Films on Silicon during Plasma Enhanced Molecular Beam Epitaxy, NCSU Materials Science Dept: **1999**.

Clifton Strengths

Character

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|-----------------------|--|
| <i>Strategic</i> | faced with any given scenario, can quickly spot the relevant patterns. |
| <i>Learner</i> | have a great desire to learn and want to continuously improve. |
| <i>Ideation</i> | able to find connections between seemingly disparate phenomena. |
| <i>Futuristic</i> | inspired by the future and what could be. |
| <i>Self-Assurance</i> | possess an inner compass yielding confidence in decision making. |

Experience

Engineering Consultant, Independent (6/11 to present)

- ▶ Compose webpage content to demonstrate work skills.
- ▶ Search for commercial contracts through staffing firms and freelance websites.

Futures Trader, Independent (9/06 to present)

- ▶ Shift from fundamental evaluation of stocks to technical analysis of futures.
- ▶ Combine statistics with digital signal processing to produce indicators with better trade signal clarity.

Research Assistant, Maine Chemistry Dept: Orono, ME (8/03 to 5/06)

- ▶ Synthesize aurophilic gold compounds, a potential drug candidate for arthritis.
- ▶ Apply cyclic voltammetry to investigate catalytic activity in gold compounds.
- ▶ Induce electrochemiluminescence in a ruthenium compound for DNA analysis.

Teaching Assistant, Rutgers Chemistry Dept: New Brunswick, NJ (1/00 to 1/03)

- ▶ Present lab techniques to students on all undergraduate levels, including PChem.
- ▶ Pass the cumulative exam, the written portion of a PhD degree.

Research Assistant, NCSU Materials Science Dept: Raleigh, NC (1/87 to 12/99)

- ▶ Develop a microwave plasma, chemical vapor deposition system, to create polycrystalline diamond from methane gas, in a regime where kinetics dominates over thermodynamics.
- ▶ Achieve a unique ellipsoidal plasma advantageous for film growth over spherical plasmas.
- ▶ Design a radio frequency nitrogen plasma source for GaN film growth.
- ▶ Monitor the surface evolution of compound semiconductor heterostructure films, in a chemical beam epitaxy system, with plane polarized reflectance spectroscopy.
- ▶ Derive substrate temperature from plane polarized reflectance intensity.

Research Specialist, MIT Advanced Energy Materials Lab: Cambridge, MA (11/84 to 1/87)

- ▶ Invent a new approach for process control to optimize laser power.
- ▶ Write a Pascal based data acquisition program for DOS environment in 1986, long before LabView enters the Windows market.
- ▶ Analyze optical signals from a ceramic powder reaction chamber, leading to a computer monitoring scheme, which replaces a human operator.
- ▶ Construct interferometer to measure film thickness, providing a realtime signal, to calibrate growthrate.
- ▶ Refine process control loop to stabilize laser power, producing a steady deposition rate with reliable material properties.
- ▶ Collect in-situ stress measurements of growing films, through deflection of an optical laser, as sample curvature evolves.
- ▶ Grow the first laser-induced, chemical vapor deposition, amorphous silicon solar cell.

Stock Investor, Independent (5/84 to 9/06)

- ▶ Evaluate fundamental aspects of technology and phamaceutical sectors.
- ▶ Choose lucrative issues, including initial pubic offerings, IPOs, based on semiconductor knowledge, similar to a venture capitalist.

Intern

Mass Field Station: Waltham, MA (5/83 to 8/83)

Grow vegetables on sewage sludge layers to determine plant uptake of heavy metals.

International Paper: Camden, AR (5/82 to 8/82)

Apply quality control principles to glossy file folder stock in a papermill process.

Sun Oil Company: Main Pass, LA (5/81 to 8/81)

Perform system maintenance, technical evaluation on an offshore oil & gas production platform: MP-293A.

Sun Oil Company: Snyder, TX (5/80 to 8/80)

Explore gas compressor repair, plant process control on a cryogenic natural gas processing facility.

Literature

Real-time Monitoring of Surface Processes by P-polarized Reflectance, J. of Vacuum Science & Technology: **1997**, A15, 807.

Molecular Layer Epitaxy by Real-time Optical Process Monitoring, Applied Surface Science: **1997**, 112, 38.

Boron Incorporation in Hydrogenated Amorphous Silicon Films Prepared by Chemical Vapor Deposition, J. of Noncrystalline Solids: **1987**, 97, 1419.

Laser-induced Chemical Vapor Deposition of Hydrogenated Amorphous Silicon: Photovoltaic Devices and Material Properties, Solar Cells: **1987**, 21, 177.

Education

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|--------------------------------|-----------------------------------|------------|
| MS <i>Physical Chemistry</i> | Rutgers: New Brunswick, NJ | Jan 2003 |
| MS <i>Material Science</i> | North Carolina State: Raleigh, NC | unofficial |
| BS <i>Chemical Engineering</i> | Texas A&M: College Station, TX | May 1984 |
| HS <i>Diploma</i> | Waltham High: Waltham, MA | Jun 1979 |

Certificate

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| <i>Computational Investing</i> | Georgia Tech: Coursera | Dec 2014 |
| <i>Computational Neuroscience</i> | Washington: Coursera | Jul 2015 |
| <i>Data Scientist's Toolbox</i> | Johns Hopkins: Coursera | Mar 2015 |
| <i>Python Programming for Everybody</i> | Michigan: Coursera | May 2015 |
| <i>Data Analysis and Statistical Inference</i> | Duke: Coursera | May 2015 |

Honor

Bausch & Lomb Science Award