



RESUME OF DAN DOBKIN

EXPERIENCE

3/94–present: **Principal**
Enigmatics

I have operated Enigmatics since 1994, both as a full-time occupation and as a supplementary activity during periods of full-time employment. Key activities as a consultant have been in the areas of intellectual property, teaching and training, semiconductor design and manufacturing, and book writing, all described in greater detail further on in this document.

4/00–4/03 **Director, Technical Marketing**
Watkins-Johnson / WJ Communications Inc.

In this position I managed mixer and converter product lines supporting cellular telephone basestation and cable TV/data markets. I led redesign of WJ's web site and produced supporting collateral for the company's product lines. My colleagues and I defined roadmaps and detailed specifications for wireless communications semiconductor products, and supported evaluation of strategic technologies and potential acquisitions in fiber optics and wireless technologies.

1993-3/94 **Manager, Advanced Process Development,
Semiconductor Equipment Group**
Watkins-Johnson / WJ Communications Inc.

I led a group of scientists and technicians supporting development and modeling of chemical vapor deposition equipment and processes. We developed processes for high-density plasma deposition and atmospheric-pressure deposition from novel precursors. We supported modeling of reactor operation and thermal TEOS deposition chemistry for continuous hardware improvement. We supported market requirements development for novel deposition equipment.

1989-1993 **Staff Scientist, Semiconductor Equipment Group**
Watkins-Johnson / WJ Communications Inc.

I worked with partner organizations including National Semiconductor, Sandia Laboratories and ATMI to develop CVD processes for tantalum pentoxide, copper, barium strontium titanate, and borophosphosilicate glasses. I supported film characterization, equipment optimization and customer requirements.

1986-1989 **Staff Scientist, Semiconductor Department (GaAs IC)**
Watkins-Johnson / WJ Communications Inc.

I developed custom approaches for submicron optical lithography using inexpensive equipment, and developed WJ's first heterostructure transistors. I specified, purchased, and implemented equipment for high-frequency (DC-18 GHz) on-wafer device characterization, including development of calibration standards and test structures for parasitic extraction and device characterization.



W. Charles Perry & Associates

ARCHITECTURAL ENGINEERING & CONSTRUCTION MANAGEMENT

1984-1986

Head, Device Development, Semiconductor Department

Watkins-Johnson / WJ Communications Inc.

I led a group of scientists, engineers, and technicians responsible for process and device development and characterization. We created a two-metal-layer microwave integrated circuit process, and a design manual and rule set to allow internal designers to create novel products. We worked with the MMIC Design group to purchase and support then-current EDA tools and developed corresponding design flows. We implemented sputtered barrier films to improve device reliability.

1980-1984

Member Technical Staff, Semiconductor Department

Watkins-Johnson / WJ Communications Inc.

I developed WJ's first recessed-gate MESFET process. I implemented plasma-deposited silicon nitride passivation films to improve device reliability. I led the purchase and implementation of WJ's first scanning electron microscope. Brad Cantos and I developed a unique double-layer lithographic technique for liftoff patterning that was used for over a decade in WJ's fab.

1979-1980

Member Technical Staff, Electron Bombarded Semiconductor Devices

Watkins-Johnson / WJ Communications Inc.

I supported process development and failure analysis for silicon diodes incorporated into vacuum tubes to form high-power microwave amplifiers.

10/99 – 4/00:

Director, Product Marketing

Sizary Inc.

I was responsible for collateral materials, pricing, market requirements statements, and cost-of-ownership estimates for the flagship Promecon product line. I led update of the company's web site. I was responsible for US sales and field process support.

2/98 – 10/99:

Co-founder & President

TimeDomain CVD Inc.

We secured SBIR contracts for development of atomic-layer chemical vapor deposition processes and inductive thermal plasma deposition and etching. We developed and presented a fabrication technology training course for a flat panel display manufacturer. I created the initial version of the tutorial web site on chemical vapor deposition processes which is currently posted at www.enigmatic-consulting.com.

TEACHING AND TRAINING

I taught extension courses, tutorials, and short courses on chemical vapor deposition and radio frequency identification. Clients include UC Extension, Software Development Forum, Chinese Engineering Association, Singapore Manufacturer's Association, The Logistics Institute, WJ Communications, and Silicon Valley Technical Institute. I have also acted as the subject matter expert for RFID Revolution's eLearning course on RFID Essentials.



SEMICONDUCTOR DESIGN & MANUFACTURING

I supported protocol verification for RFID chip designs and created draft documentation for custom RFICs. I provided consulting services in dielectric deposition and semiconductor characterization, including the development of a patented process for qualifying heterostructure epitaxial layers. I led concept and feasibility studies, including development of a novel chemical vapor deposition reactor configuration. I provided due diligence support for investments related to atomic-layer deposition tools and thin film photovoltaic deposition. I was a testifying expert in a contract lawsuit between Qualcomm and Hughes Electronics related to GaAs integrated circuit fabrication.

INTELLECTUAL PROPERTY/US PATENTS

Intellectual property

I have assisted inventors in producing patent disclosures in semiconductor design, communications technology, and RFID, and provided technical support during the process of patent prosecution. (Four of these disclosures have led to granted patents.) I testified as an expert on plasma TEOS deposition in patent litigation between Applied Materials and Novellus. I provided technical consultation regarding patent-related litigation between RFID companies.

US Patents – Joint Inventions

- 6,521,048 Single body injector and deposition chamber
- 6,200,389 Single body injector and deposition chamber
- 6,022,414 Single body injector and method for delivering gases to a surface
- 5,865,657 Fabrication of gated electron-emitting device ...
- 5,304,398 Chemical vapor deposition of silicon dioxide using hexamethyldisilazane

US Patents – Sole inventor

- 5,691,642 Method and apparatus for characterizing a plasma using broadband microwave...
- 5,639,343 Method of characterizing group III-V epitaxial semiconductor wafers ...

PUBLICATIONS & PRESENTATIONS

Books

- The RF in RFID, Elsevier, September, 2007
- RF Engineering for Wireless Networks, Elsevier, 2004
- Principles of Chemical Vapor Deposition, with Michael Zuraw, Kluwer, 2003

Technical publications

- "Segmented Magnetic Antennas for Near-field UHF", with Steven Weigand, Microwave Journal, June, 2007
- "RFID Thrown for a Loop: Near-field UHF", RFID for Pharmaceuticals, Philadelphia, August 2, 2006



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- "Multiple RFID Tag Plane Array Effects", with Steven Weigand, IEEE Antennas and Propagation Society Symposium, July, 2006
- "Introduction to RFID" (tutorial presentation), IEEE MTT-S, San Francisco, CA, June, 2006
- "UHF RFID and Tag Antenna Scattering (part 1)", with Steven Weigand, Microwave Journal, May 2006, p. 170
- "Introduction to RFID: History, Technology, and Applications", with Titus Wandinger, High Frequency Electronics, June, 2005, p. 46
- "Environmental Effects on RFID Tag Antennas," with Steven Weigand, IEEE MTT Symposium, June 2005, Long Beach, CA, USA, paper TU3A-2
- "RFID: The power to transform global business and lifestyles?", RFID Summit, Singapore, November 16, 2004
- "The Correlation of Data Throughput with Link Loss for Commercial WLAN Devices", High Frequency Electronics, January 2003, p. 22
- "The Hierarchy of Wireless Data Networking", WIC 2002, Ottawa, Canada, October 15-16, 2002
- "ISPN" (Integrated Services Practical Network): Why and How WLAN and WAN Will Coexist", WIC 2002, Ottawa, Canada, October 15-16, 2002
- "Indoor propagation issues for wireless LANs", RF Design, September 2002, p. 40
- "Coherent Optical Receivers for Broadcast Communications Architectures," with G. Klimovitch and D. Kurtz; proceedings of the National Fiber Optic Engineers Conference (NFOEC), September, 2002, Dallas, TX.
- "Weigh Amplifier Dynamic Range", with W. Strifler and G. Klimovitch; Microwaves and RF December 2001.
- "Applying an Electric Field to Control Metals in Furnaces", with I. Rapoport, V. Starov, Y. Raskin and S. Zaidman; Solid State Technology, August, 2000, p. 83
- "Atmospheric Pressure Inductive Soft Etch for Photoresist Strip", with Simon Selitser: AVS Microelectronics Conference, February, 2000
- "An Oxygen Plasma Flash Process for the Control of Corrosive Gas Migration in a Semiconductor Wafer Plasma Etch System", with P. Brunemeier, T. Miu, W. Collison, W. Klippert, and C. Vetter; National Symposium of the American Vacuum Society, San José, CA, October 20-24 1997
- "Ion-Bombardment-Induced Compositional Change in ECR-CVD SiO₂ and SiN:H", with K. Seaward, F. Mertz and K. Nauka; Proceedings of the Thirteenth International Conference on Chemical Vapor Deposition, Los Angeles, May 5-10, 1996, p. 523
- "Method for Characterization of III-V Epitaxial Structures Incorporating an Etch Stop Layer", w. W. Hitchens, C. Lee, C. Dalmacio, S. Snider and R. Remba; International Conference on GaAs Manufacturing Technology, San Diego, April 28-May 2, 1996.
- "Mechanisms of Deposition of SiO₂ from TEOS and Related Organosilicon Compounds and Ozone", with Simin Mokhtari, Mel Schmidt, Anil Pant, Linda Robinson, and Art Sherman, J. Electrochem. Soc. 142 2332 (1995)
- "Profile Simulation Studies of Oxide Deposition from Ozone/TEOS", with J. Li, J. McVittie, J. Ferziger, K. Saraswat and M. Schmidt, presented at the Electrochemical Society Spring Meeting, San Francisco, May 24-27, 1994.



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ARCHITECTURAL ENGINEERING & CONSTRUCTION MANAGEMENT

- "Mechanisms of Deposition of SiO₂ from TEOS and Related Organosilicon Compounds and Ozone", with Simin Mokhtari, Mel Schmidt, Anil Pant, Linda Robinson, and Art Sherman; presented at the Schumacher CVD Symposium, San Diego, February 7-8, 1994.
- "Deposition of Silicon Dioxide from Hexamethyldisilazane and Ozone", with James Garcia, Wilbur Krusell, Fred Walker, and José Casillas, Journal of Chemical Vapor Deposition, January 1993.
- "Electrical and Physical Properties of Tantalum Oxide Thin Films Deposited by Low Pressure Chemical Vapor Deposition", with William Hitchens and Wilbur Krusell, Materials Research Society Fall Meeting, Boston, November 30–Dec 4, 1992.
- "Kinetics and Uniformity of Deposition of Borophosphosilicate Glass from Silane and Oxygen in a Single-Wafer Reactor", Journal of the Electrochemical Society 130 2573 (1992).
- "Harmonic Behavior of MMIC Variable Attenuators" with David Fisher; Asia Pacific Microwave Conference, Tokyo, September 1990.
- "A Temperature-Compensated Linearizing Technique for MMIC Attenuators Using GaAs MESFETs as Voltage-Variable Resistors" with David Fisher; Digest of the IEEE-MTT International Microwave Symposium, Dallas, June 1990, p. 781.
- "Atmospheric Pressure Chemical Vapor Deposition of Tungsten Silicide" with Jay Dedontney, Gregory McDaniels and Larry Bartholomew; Journal of the Electrochemical Society 137 1623 (1990)
- "Bias-Stress Stability of GaAs MESFETs" with Ron Besser and C. Helms; Journal of the Electrochemical Society 136 3478 (1989)
- "Reduction of GaAs MESFET Sidegating by UV/Ozone Cleanup Prior to MBE Growth" with William Hitchens and Paul Brunemeier; Journal of Vacuum Science and Technology B7 680 (1989)
- "Monolayer Surface Doping of GaAs from a Plated Zinc Source" with James Gibbons; Applied Physics Letters 44 884 (1984)
- "Thermal Pulse Diffusion of Zn in GaAs from an Elemental Source" with James Gibbons; Journal of the Electrochemical Society 131 1699 (1984)
- "Lift-off Lithography using Low-Frequency Plasma Buffer Layers" with Brad Cantos and Don Deal; Proceedings of the Fourth Symposium on Plasma Processing. Ed. G. Mathad, G. Schwartz, and G. Smolinsky, p. 192; The Electrochemical Society, Inc. (Pennington, N.J.), 1981
- "Plasma Formation of Buffer Layers for Multilayer Resist Structures" with Brad Cantos; IEEE Electron Device Letters EDL2 222 (1981)
- "GaAs MESFETs with Non-Alloyed Ohmic Contacts" with Rick Gold, Yves Nissim and James Gibbons; International Electron Devices Meeting, Washington, D.C., December 1981
- "CW-Laser Assisted Diffusion of Tin in GaAs for Non-Alloyed Ohmic Contacts" with Yves Nissim, Rick Gold and James Gibbons; Fall Meeting of the Electrochemical Society, Hollywood, Florida, October, 1980
- "Unusual Phenomena in CVD SiO₂ under Sustained Electron Bombardment" with Ron Kane; IEEE Transactions on Electron Devices, ED27 1841 (1980)

EDUCATION

- 1985 Ph.D., Applied Physics, Stanford University
- 1979 M.S., Applied Physics, Stanford University
- 1976 B.S., Applied Physics, California Institute of Technology