

## Daniel M. Dobkin, Ph. D.

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**Summary:** Semiconductor processing, CMOS reliability, reactor design, energy generation and storage, chemical engineering, material characterization, low-power radio, and the ability to explain in the simplest way that's right. And funnier than the average engineer (which isn't saying much).

## Employment History

### 3/18 to present: High Volume Manufacturing Support, AltaDevices

- Energy storage and fuel cell development.
- MOCVD exhaust analysis and optimization.
- Reactant synthesis at point of use.

### 2/17 to 2/18: Principal Development Engineer, AltaDevices

- MOCVD exhaust optimization, toxic material handling.
- Support modeling for CVD equipment optimization.

### 3/94 – 2/98, 5/03 to 12/10, 9/16 to 1/17: Principal, Enigmatics

- Heating package and exhaust design support for high-volume photovoltaic manufacturing
- Author of "The RF in RFID", Elsevier, 2<sup>nd</sup> Ed 2012; "RF Engineering For Wireless Networks", Elsevier, November 2004; "Principles of Chemical Vapor Deposition" with Michael Zuraw, Kluwer Academic, April, 2003, and numerous technical articles.
- Patent disclosures for analog IC designs.
- Documentation for 802.11-based networking products.
- RFID training for Software Development Forum RFID Bootcamp, Chinese Engineering Association, RFID Focus / SMA and TLI MasterClass, WJ Communications Compact Reader College, Silicon Valley Technical Institute, client sites; development of interactive eLearning materials for RFID Revolution LLC.
- Intellectual property development for RFID and communications technology.
- Characterization of RFID tag antennas, near-field RFID reader antennas.
- Due diligence for semiconductor equipment acquisition, solar photovoltaic investment.
- Testified as an expert witness in lawsuit involving fabrication of GaAs MMICs, and patent litigation involving plasma TEOS.
- Consultant on dielectric processes for emissive flat panel displays; developed company training course on flat panel display manufacture.
- Modeling of light-actuated high-power thyristor devices.
- Supported market research and concept & feasibility studies for new CVD reactors.
- Developed novel patented method for characterizing heterostructure epitaxial layers.
- Taught UC Extension course on chemical vapor deposition.

### 1/11 to 8/16: Staff Scientist, R2 Semiconductor

- One of the three architects that defined the first R2 product to ship in volume.
- High-switching-frequency DC-DC converter IC system definition and documentation.

- ESD testing and specification:
  - 180 nm GGNMOS, GCNMOS, SCR structures; HBM, MM, TLP characterization, TECAD modeling
  - 28 nm diode-triggered SCR implementation
- Reliability and failure analysis:
  - metallization, electromigration, latchup requirements
  - bench characterization, HAST/HTOL support
  - parallel lap, optical and SEM inspection, FIB cross-sectional analysis, backside infrared, OBIRCH
- Patent disclosures and administration.
- Bringup and characterization of new IC designs.
- Test requirements and test support.

**4/00 - 4/03: Director, Technical Marketing, WJ Communications Inc.**

- Define roadmaps for wireless communications semiconductor products
- Manage mixer, converter, CATV product lines
- Evaluation of strategic technologies and potential acquisitions
- Led web site update project

**10/99 – 4/00: Director, Product Marketing, Sizary Inc.**

- Responsible for collateral materials, pricing, market requirements and cost-of-ownership estimates for Promecon™ product line
- Responsible for US sales support and field process support

**2/98 – 10/99: Co-founder and President, TimeDomain CVD Inc.**

- Private and SBIR contracts for development of CVD processes and inductive thermal plasmas
- Training development in flat panel display processing, and legal and technical consulting
- Tutorial web site on CVD and related topics  
[[http://www.enigmatic-consulting.com/enigmatics/semiconductor\\_processing/semi\\_index.html](http://www.enigmatic-consulting.com/enigmatics/semiconductor_processing/semi_index.html)]

**1979 - 3/94 Watkins-Johnson Company**

**1993-3/94 Manager, Advanced Process Development, Semiconductor Equipment Group**

- Deposition of silicon dioxide using high-density plasmas and atmospheric pressure thermal reactors
- Modeling and analysis of deposition hardware and process chemistry
- Novel platforms and support of market requirements analysis

**1989-1993 Staff Scientist, Semiconductor Equipment Group**

- CVD process and equipment development; internal courses in mass and heat transport

**1986-1989 Staff Scientist, Semiconductor Department (GaAs IC)**

- Submicron lithography development, III-V MESFET and HEMT process development

**1984-1986 Head, Device Development, Semiconductor Department**

- Commercial GaAs IC processes, on-wafer RF characterization

**1980-1984 Member Technical Staff, Semiconductor Department**

- GaAs process development; PECVD thin films

**1979-1980 Member Technical Staff, Electron Bombarded Semiconductor Devices**

**Education:**

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

## Publications:

Cited >1,200 times so far according to ResearchGate.

### Books:

**The RF in RFID**, Elsevier, September, 2007, 2<sup>nd</sup> edition December 2012

**RF Engineering for Wireless Networks**, Elsevier, 2004

**Principles of Chemical Vapor Deposition**, with Michael Zuraw, Kluwer, 2003

### Technical publications:

“Cooperative Tag Communications”, with Tali Freed, Christopher Gerdorn, Carlos Flores, Eric Futak and Clay Suttner, IEEE RFID-TA, Tokyo, Japan, September 2015; fully animated version at <https://youtu.be/mM4S-wDrvYI>

“Santa Clara Law Best Practices in Patent Litigation Survey (September 1, 2013)” with Colleen Chien, Wesley Helms, Coryn Millslagle, Nicole Shanahan, and Christopher Patrick Tosetti, Santa Clara Univ. Legal Studies Research Paper No. 27-13. Available at SSRN: <http://ssrn.com/abstract=2321363> or <http://dx.doi.org/10.2139/ssrn.2321363>

“Tutorial: The Basics of UHF RFID or Radiating Without a License” (Invited), IEEE RFID 2010, Orlando, FLA, and IEEE RFID 2011, Orlando, FLA

“Introduction to RFID” (tutorial presentation), IEEE Radio and Wireless Symposium, San Diego, CA, January, 2009

“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

“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 SiO<sub>2</sub> 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 SiO<sub>2</sub> 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.

"Mechanisms of Deposition of SiO<sub>2</sub> 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 SiO<sub>2</sub> Under Sustained Electron Bombardment"  
with Ron Kane; IEEE Transactions on Electron Devices, ED27 1841 (1980)

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## US Patents

Joint inventions:

9,069,365 DC-DC converter enabling rapid output voltage changes  
8,843,180 Multimode operation DC-DC converter  
8,725,218 Multimode operation DC-DC converter  
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 ...

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5,304,398 Chemical vapor deposition of silicon dioxide using hexamethyldisilazane

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 ...

updated: 11/8/19