

Jeffrey R. Lapidés, Ph.D.
jeffrey.lapides@gmail.com
Annapolis, MD
410-303-3363 (mobile/text)

PROFILE

- Physicist, consultant, analyst, strategist, and executive in industry and academia.
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BACKGROUND

- Many years experience in consulting and executive management.
 - Customers at public & private corporations and government.
 - Engagements with a mix of business, technical, mathematical and scientific challenges.
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EDUCATION

- Ph.D. in Physics, University of Maryland, College Park, MD
 - M.S. in Physics, University of Maryland, College Park, MD
 - B.A. in Physics, Clark University, Worcester, MA
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WORK HISTORY

Lapides Consulting

1996 -

Management and Technical Consultant

- Founder of firm that provides consulting in advanced data science and business & IT strategy in scientific, technological and health-related domains.
 - Industry experience includes: life sciences, healthcare, semiconductors, retail products, metal products, manufacturing, software products, communications devices, environmental services, food services, publishing, agriculture, aquaculture, defense and government.
 - Strategy experience includes: IT, work-out, operations and finance.
 - Analytics experience includes: machine learning, predictive analytics, natural language processing, social network analysis, manufacturing, distribution and logistics, inventory and route optimization, revenue forecasting, human resource dynamics, grant portfolios, energy use, and document classification.
- Work with scientists, academic institutions, and individual and corporate patrons of science to create scientific research programs.

**University of Md, College Park
2009 - 2011**

Director of Corporate and Foundation Relations

Arranged private financing for faculty in advanced research in science and engineering.

- Worked with and mentored scientists from numerous fields to position their work for private corporate or foundation funding including: quantum computing, lab-on-a-chip technology, infrared astronomy, spintronics, enzymology, nanotechnology, genomics, bioinformatics, public health, Earth remote sensing and medical imaging.
- Negotiated research relationship between Canon corporation and UMD's bioengineering department to develop an automated pathogen detection system for human blood.
- Developed relationships with geospatial satellite companies to support research in infectious disease identification from space.
- Conducted multiple internal research competitions involving dozens of researchers from all fields. Results were used to identify key researchers for new corporate and foundation relationships, especially the Keck Foundation.
- Mentored researcher who developed injectable MRI probes. Helped him introduce ideas to leading medical imaging companies.

Essex Corporation (acquired by Northrop - Grumman)

1989 - 1996

Vice President

Key member of executive team. Formulated strategy and financings for this optical technology R&D firm mainly doing business with the U.S. Department of Defense. Developed research collaborations with industry and academia in photonic image processing applications for MRI and microscopy.

- Worked with science staff to identify commercial opportunities for company's synthetic aperture radar technology. Helped them understand its value for magnetic resonance imaging and a new form of microscopy called synthetic aperture microscopy (google: lapides synthetic aperture microscopy).
- Authored, prosecuted and secured several U.S. patents for company's imaging technologies.
- Built relationships with major academic research institutions and international industrial firms to further research and development of this imaging technology.
- Worked with senior executive staff to define strategies for debt restructuring and equity financing and assisted in securing capital.

Allegheny Beverage Corporation (Acquired in management buyout)

1982 - 1989

Executive VP, CIO and other positions

Led this \$1.2 billion, 20,000 person services and manufacturing firm during a financially challenging period which included complex M&A and financing activities. As CIO, modernized IT in four divisions. Began as management trainee (nepotism helped).

- Managed corporate turnaround through severe cash crisis, avoiding insolvency, bankruptcy and improving cash flow by \$50 million.
- Ran divestiture M&A activities resulting in \$750 million in transactions over about two years.
- Managed \$80 million going private transaction.
- Reduced corporate bureaucracy of 200 to 40 in nine months while maintaining control of the company's core financial systems.
- Introduced and implemented advanced analytics into operations, solving numerous problems involving plant efficiency, vehicle routing, and material management and distribution, forecasting and budgeting.

**NIH - Nat'l Institute of Diabetes, Digestive and Kidney Diseases, Lab for Chemical Physics
1981-1982**

Staff Fellow

Conducted research on the physics of cell membranes using laser Raman spectroscopy.

- Measured effects of membrane components on the stability of lipid bilayers to elucidate how substances such as nutrients, toxins or medicines cross the biological cell surface
- (google: lapides ira levin).

NASA - Goddard Space Flight Center

1976-1981

Research Assistant

Conducted research on the physics of solar flares and planet formation using gamma-ray and x-ray spectroscopy and neutron transport theory.

- Ph.D. thesis on the remote measurement of planet and comet asteroid composition using cosmic ray induced gamma-ray detection.
- Cited by scientists publishing on the Mars Odyssey mission (google: lapides gamma ray).
- Solar flare research – studied gamma-ray producing nuclear reactions involving Carbon and Oxygen for use in solar flare temperature measurement.

CONTRACTS (partial list):

Note: In some situations, when the prime contractor did not provide services, I have listed only the source contractor. I generally do not (or am not allowed to) disclose names of private clients.

Research (self-supported) - (2016 - present) Used machine learning approaches to characterize the microbiomes of healthy and diseased patients. Have analyzed about 5,000 subjects' microbiomes with a variety of medical conditions. Also analyzed a cohort of 70,000 subjects' medical records to predict hospitalization and other variables.

Private client (2017-2018). Microbiome classification and relationship to Parkinson's and Sickle Cell Disease - Used machine learning approaches to characterize the microbiomes of healthy and diseased patients.

Network Science Center, United States Military Academy - West Point, (2015 -2016). Detecting Dark Networks using Graph Theoretic and Probabilistic Methods. Developed machine learning algorithms for detecting criminal networks in general social networks.

National Institutes of Health, Office of Behavioral and Social Sciences Research and Science and Technology Policy Institute (2015 - 2017), Developed machine learning classification and graph theoretic methods for analysis of scientific documents to predict behavior in the scientific community in order to better allocate funding.

National Institute of Food and Agriculture - USDA (2013-2014) Developed classification and graph theoretic methods for analysis of scientific documents to understand the scientific community in order to better allocate funding.

International Japanese Industrial Firm (2012). Performed a strategic analysis of the emerging microbiome in vitro testing marketplace.

International Aerospace Firm (2008). Identified and evaluated life sciences and quantum dot technology companies for acquisition or other transactions.

Large government technical consulting firm. Advised firm on semantics technology and managed collaboration with major computer manufacturer.

General Services Administration. In support of GSA's goal of optimizing \$10 billion in federal travel spending, prepared a strategy for creating actionable business intelligence for air, train, hotel and vehicle spending.

U.S. Citizenship and Immigration Service (2003). Created an IT roadmap for the agency focused on actionable analytics shortly after the 9/11-related Immigration and Naturalization Service reorganization.

Large home healthcare firm. Assisted in reorganization of case management processes to optimize response to patients.

OTHER ANALYTICAL PROJECTS (partial list):

National food service firm. Solved riddle of collapsing revenue in \$600 million food vending operation. Management thought it resulted from an emerging recession. Proved it resulted from faulty vehicle routing algorithms it had recently implemented.

National food service firm. Determined that company's food distribution in \$1 billion food subsidiary was operating inefficiently and below optimum. Implemented new distribution system, providing substantial savings and improvements in customer service.

National industrial service firm. Mathematically modeled numerous business processes as part of revamping a \$1.2 billion budget process.

National industrial service firm. Developed many valuation models as part of turn-around M&A activities. Used in negotiations of \$175 million credit facility and with buyers of operating assets of the company. Also developed operations models used to improve cash flow by ~\$50 million.

National industrial service firm. Constructed employment duration distributions for 20,000 person operation to understand regions where talent/experience drain was affecting operations. Used results to convince operating management how much to allocate to training and development of employees.

National industrial service firm. Faced with the need to cut a corporate bureaucracy of 200 to 25% of initial size, the initial options were draconian cuts likely to cause the loss of financial control or gradual cuts contributing to the likelihood of bankruptcy. Realized that the "decision making power" of the staff far exceeded its leadership. Successfully engaged staff in a bargain to achieve and manage their own cuts.

National industrial service firm. Constructed building energy consumption distributions to identify optimal energy conservation measures for a 200 building real estate portfolio.

Large Beverage Manufacturer. Developed forecasting for \$180 million beverage manufacturer to drive inventories to a minimum and optimize plant operations in a multi-plant multi-warehouse environment. Incorporated complex seasonality behavior and competitive pricing environment that could change inventory requirements on a daily basis.

Large Beverage Manufacturer. Using visualizations of production line downtime distributions for 20-million case-per-year operation, identified serious flaw in cost accounting system that was masking a major plant maintenance problem and substantially adding to production cost.

PUBLICATIONS:

Woodford, P., Turpin T. M., Rubin, M. W., Lapidés, J.R., Price, C. H., (1996) Synthetic aperture microscope: experimental results. Hybrid Image and Signal Processing V, Proc. SPIE, 2751.

Turpin, T. M., Gesell, L. H., Lapidés, J.R., Price, C. H. (1995) Theory of the synthetic aperture microscope. Proc. SPIE 2566, Advanced Imaging Technologies and Commercial Applications.

Huang, C. H., Lapidés, J.R., Levin, I. W., (1982) Phase-transition behavior of saturated, symmetric chain phospholipid bilayer dispersions determined by Raman spectroscopy: correlation between spectral and thermodynamic parameters. Journal of the American Chemical Society. 104 (22), 5926-5930.

Evans, L. G., Lapidés, J.R., Trombka, J. I., Jensen, D. H., (1982) In situ elemental analysis using neutron-capture gamma-ray spectroscopy. Nuclear Instruments and Methods in Physics Research. 193(1-2), 353-357.

Lapidés, J. R., (1981) Planetary Gamma-Ray Spectroscopy: The Effects Of Hydrogen And The Macroscopic Thermal-Neutron Absorption Cross-Section On The Gamma-Ray Spectrum. Ph.D.Thesis, University of Maryland, College Park.

Lapidés, J.R., Evans L. G., Trombka J. I., (1981) Determination of Elemental Composition in Geochemical Exploration Using a 14-MeV Neutron Generator Ii. Theoretical Aspects. IEEE Transactions on Nuclear Science. 28:2, 1629 - 1631.

Lapidés, J. R., Crannel, C. J., Crannel, H., Hornyak, W. F., Seltzer, S. M., Trombka, J. I., Wall, N. S., (1978) Measurements of the 15.1-MeV Gamma-Ray Flux Produced In Carbon and Oxygen (p-p) Reactions. In: "Gamma Ray Spectroscopy In Astrophysics", Cline T. L., Ramaty R. (eds), NASA Technical Memorandum 79619, 502-511.

Identify Citations with following searches:

Google: lapides synthetic aperture microscopy

Google: lapides gamma ray (scientists on the Mars Odyssey mission and gamma-ray astronomy)

Google: lapides ira levin. (biophysics)

BIOGRAPHICAL STATEMENT:

I have worked for more than 30 years at the intersection of science, technology and business management. Most recently, I have focused on data science and on the finance of scientific research in an independent consulting practice.

Over the last six years, I have worked on a variety machine learning problems involving scientific data, social networks and scientific documents. This work involved advanced classification algorithms and graph theory. In my earliest work, I analyzed the structure of scientific communities for NIH and USDA. I used this approach to identify mature scientific domains, emerging areas of research and evaluated granting agency efforts to create new categories of scientific research. Another project involved using similar techniques to identify criminal networks within random social networks for the Army. I also used these classification techniques to do epidemiology from medical records where I found relationships between conditions not normally considered to be causally related. Most recently, I have applied related techniques to understanding the relationship of microbiome abundance data to diseases and symptoms.

I began my career as a physicist, obtaining a Ph.D. from the University of Maryland and spending a year at NIH's Laboratory for Chemical Physics as a postdoctoral fellow.

Soon after, driven by the need to support a young family, I moved into information technology management at a national services corporation, eventually becoming its CIO. Thereafter I transitioned into executive management where I had the opportunity to lead the company through a financially challenging period.

I continued my executive career with an optical R&D firm (Essex Corporation, acquired by Northrop Grumman) where I focused on building relationships between academia and large international technology firms. I also developed and prosecuted the company's intellectual property portfolio in microscopy and medical imaging and assisted with corporate finance.

Twenty-two years ago, I started my own consulting firm that brought together the knowledge gained from these diverse areas to consult with large firms and government entities. In business, I used my science and mathematics background to pioneer business applications based on operations research and to undertake analytics and data science projects. As a consultant, I continued that work. My other backgrounds enabled me to work in many technological and scientific fields and with a wide array of measurement and mathematical techniques.

Nine years ago, I had the opportunity to bring these capabilities to an academic institution at the University of Maryland, College Park. At UMD, I worked to establish relationships between researchers and industry, mentoring many scientists in the process. I left six years ago to continue my consulting practice.

My corporate work also has allowed me to develop many capabilities including: operating and information management practice, information technology systems, corporate law and finance, intellectual property law, financial accounting, and strategic planning.

I continue to help scientists find support and independently engage in theoretical science research.

I have a Ph.D and M.S. from the University of Maryland, College Park and a B.A. from Clark University, all in physics.