BIOGRAPHICAL SKETCH

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NAME: **Lapides, Jeffrey R.**

eRA COMMONS (credential, e.g., agency login): JLAPIDES

POSITION TITLE: Adjunct Associate Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
NIH-NIDDK, Lab. for Chemical Physics	Post-Doctoral	1982	Biology
University of Maryland, College Park, MD	Ph.D.	05/1981	Physics
University of Maryland, College Park, MD	M.S.	05/1979	Physics
Clark University, Worcester, MA	B.A. (*cum laude*)	05/1976	Physics(w/high honors)

A. Personal Statement

I am an experienced technical manager. I began my career in research science and switched to industry very early, where I worked as a senior executive, in both IT and science, in public companies and as an independent technical consultant. Over time, I migrated back toward academic research where I am now. I have worked with a variety of spectroscopic techniques including IR, Raman, UV, x-ray and gamma-ray. These have led to diverse applications from the study of solar flares, planetary atmospheric and surface composition, and the physics of biological cell membranes. I worked with a corporate team that transitioned the idea of Synthetic Aperture Radar to the visible part of the spectrum to develop a new form of lens-less microscopy called Synthetic Aperture Microscopy. A companion part of my work involved complex simulation and Monte Carlo statistics where I simulated cosmic ray interactions with planet surfaces that release gamma-rays which can be sensed by remote spacecraft. These later capabilities led me back to academic research, first in natural language processing (computational linguistics) and then in bioinformatics applied to the microbiome and genome.

Throughout graduate school, I worked as a research assistant at NASA - Goddard Space Flight Center where I was involved in the study of solar flares (Solar Maximum Mission) and planet surfaces (Apollo Missions Data). After receiving a Ph.D. in physics, I decided to switch from the astronomical sciences to life sciences and obtained a post-doctoral fellowship at NIH's Lab for Chemical Physics where I studied perturbed lipid structures in biological membranes with Raman spectroscopy.

After a year, I left academic research science for industry because of a major opportunity. I held a series of C-level executive positions in two public companies, many of which involved IT or advanced technology. At the first company, I began as an IT executive, eventually becoming the CIO. I also held positions of increasing responsibility that culminated in Executive VP, the number two position in a company with revenues of over $1 billion and 20,000 employees. I successfully led the company through a period of extreme financial challenge where I stabilized the operations and managed the sale of its operations for over $700 million. In the second firm, I was part of an executive and scientific team that focused on transitioning military technology to commercial applications.

Preferring a more entrepreneurial lifestyle, I left industry and founded my own consulting firm pursuing clients at the intersection of science and business. This path led me back to academic science where I was asked to

join University of Maryland, College Park to assist in forging relationships between industry and researchers which culminated in a multi-million relationship between Canon Corporation - Life Sciences and UMD's Department of Bioengineering involving automated pathogen detection and the microbiome.

Shortly thereafter, I went back to consulting and was asked to help solve a mathematical problem at the USDA's National Institute of Food and Agriculture. It involved the use of an algorithm, Latent Dirichlet Allocation, to classify technical documents. I went on to do this for NIH too. While doing this research, I started to realize that LDA could be a useful algorithm for understanding the human microbiome. I had no clients in this area but was so fascinated that I decided to invest in myself and adapt the algorithm to the microbiome and developed new ways of visualizing the complex results from LDA using graph theory. After a while, I was able to see patterns that I did not see in the literature. Acquiring publicly available data, I went on to analyze nearly 7,000 subjects and began to try to find an academic group to work with. This seemed daunting and did not meet with immediate success. During my effort, I solicited the opinion of my supervisor from my NIH postdoctoral work, Dr. Ira Levin, now the intra-mural Director of Science for NIDDK, showing him some of my work. I was surprised when he whole-heartedly encouraged me.

My search eventually led me, through a mutual acquaintance, to contact Professor Garth Ehrlich, the PI for this proposal, and he invited me to give a talk to his group. Intrigued with my approach, he provided me with microbiome data from the brains of human subjects with Alzheimer's disease to see if my methods could find any interesting patterns. I was able to quickly find a relationship between a set of bacteria at particular abundances with Alzheimer's that prior analysis had not found. Not too long after, I was asked to join his group as an adjunct Associate professor. The results of this 3-year collaboration can be found in the preprint below.

Moné Y, Earl JP, Krol, Ahmed A, Sen B, Ehrlich GD, Lapides JR. 2022. Evidence for the Existence of a Bacterial Etiology for Alzheimers Disease and for a Temporal-Spatial Development of a Pathogenic Microbiome in the Brain. bioRxiv doi: 10.1101/2022.08.28.505614

B. Positions, Scientific Appointments, and Honors

Positions:

2019-	Adjunct Associate Professor, Drexel Univ. College of Medicine, Dept. of Microbiology and Immunology
1996-	Management and Technical Consultant
2009-2011	Director of Corporate & Foundation Relations, Univ. of Maryland, College Park
1989-1996	Vice President, Essex Corporation (acquired by Northrop Grumman)
1982-1989	Executive VP, CIO, other positions, Allegheny Beverage Corporation
1981-1982	Staff Fellow, NIH-NIDDK Laboratory for Chemical Physics
1976-1981	Research Assistant, NASA-Goddard Space Flight Center & University of Maryland

Honors and Awards: 1977 - High Honors in Physics, 1976 - Phi Beta Kappa, 1976 - Albert C. Erickson Scholarship, 1976 - BA *cum laude*

C. Contributions to Science

1. My doctoral work explored planetary remote sensing techniques using gamma-ray spectroscopy. Specifically, the research used Monte Carlo techniques to predict cosmic ray induced planetary surface neutron fluxes that resulted in gamma-ray emissions that could be detected from orbit or on the surface. This work later influenced instrumentation for the Mars Odyssey mission that detected water on Mars.

   Lapides, J. R. (1981). *Planetary Gamma-Ray Spectroscopy: the Effects of Hydrogen and the Macroscopic Thermal-Neutron Absorption Cross-Section on the Gamma-Ray Spectrum*. [Doctoral thesis, University of Maryland, College Park]

2. While working at an advanced technology firm (later acquired by Northrop Grumman), I became part of a group that focused on Synthetic Aperture Radar, an inverse imaging technique related to both x-ray crystallography and MRI. We realized that there was another related technique that had not yet been

developed at visible wavelengths. We developed the theory and initial prototypes for Synthetic Aperture Microscopy and later patented the technique.

Turpin, T. M., Gesell, L. H., Lapides, J., & Price, C. H. (1995, August). Theory of the synthetic aperture microscope. In Advanced Imaging Technologies and Commercial Applications (Vol. 2566, pp. 230-240). SPIE.

Woodford, P., Turpin, T. M., Rubin, M. W., Lapides, J., & Price, C. H. (1996, June). Synthetic aperture microscope: experimental results. In Hybrid Image and Signal Processing V (Vol. 2751, pp. 230-240). SPIE.

Publications

Turpin, T. M., Gesell, L. H., Lapides, J., & Price, C. H. (1995, August). Theory of the synthetic aperture microscope. In *Advanced Imaging Technologies and Commercial Applications* (Vol. 2566, pp. 230-240). SPIE.

Huang, C. H., Lapides, 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., Lapides, 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.

Lapides, J. R. (1982). Planetary Gamma-Ray Spectroscopy: the Effects of Hydrogen and the Macroscopic Thermal-Neutron Absorption Cross-Section on the Gamma-Ray Spectrum.

Evans, L. G., Trombka, J. I., Lapides, J. R., & Jensen, D. H. (1981). Determination of Elemental Composition in Geochemical Exploration Using a 14-MeV Neutron Generator I. Experimental Aspects. *IEEE Transactions on Nuclear Science*, *28*(2), 1626-1628.

Lapides, 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.

Woodford, P., Turpin, T. M., Rubin, M. W., Lapides, J., & Price, C. H. (1996, June). Synthetic aperture microscope: experimental results. In *Hybrid Image and Signal Processing V* (Vol. 2751, pp. 230-240). SPIE.

Moné Y, Earl JP, Krol JE, Ahmed A, Sen B, Ehrlich GD and Lapides JR (2023) Evidence supportive of a bacterial component in the etiology for Alzheimer's disease and for a temporal-spatial development of a pathogenic microbiome in the brain. *Front. Cell. Infect. Microbiol.* 13:1123228. doi: 10.3389/fcimb.2023.1123228