I was born and brought up in New York City, and graduated from Stuyvesant High School in 1970 (in the run-down old building on First Avenue between 15th and 16th streets, not the palace down in lower Manhattan that exists now). I received my college education at Williams, which was a wonderful experience; my Biology Honors thesis involved electron microscopy, and so I was very well educated in cell biology and EM well before medical school.

I went to medical school at the University of Miami School of Medicine, from which I received both my MD (1978) and my PhD (1980), the latter in Physiology & Biophysics. My graduate research concerned mechanisms of synaptic transmission, utilizing neuromuscular junctions in frogs and mice as models, and involved intracellular neurophysiological recordings, transmission electron microscopy, and membrane fusion experiments using liposomes, analyzed with freeze-fracture electron microscopy. My first publication, based on early work during my PhD thesis project, was in Nature (and it has been all downhill ever since). Other parts of my thesis were published in J Physiol (the one from London) and in Biochem Biophys Acta.

After finishing my PhD I did my residency training at the Massachusetts General Hospital in Boston. I did two years of Anatomic Pathology and two years of Neuropathology there. MGH pathology training was (and is) a premier place to learn surgical pathology, autopsy pathology, and clinical correlations, and the stress on correlating pathology findings with clinical data has remained with me throughout my professional life. I had wonderful mentors in general anatomic pathology, including Robert Scully, Max Goodman, Alan Schiller, Ben Pilch, and Eugene Mark. My neuropathology mentors were the late E P Richardson Jr and Tessa Hedley-Whyte, both of whom became friends as well as mentors and colleagues. Their was equally great stress on clinical correlations with neuropathology there, and this was the foundation for much of my later work. While at MGH I was also fortunate enough to be involved in some of the earliest work on pathology correlates of MR imaging (known then as NMR before political correctness took the “nuclear” out of the name), and so one of my early papers was a founding paper with neurology and radiology colleagues on MR findings in ischemic stroke.

My main focus throughout my career as a neuropathologist had its genesis at MGH, namely my strong interest in CNS tumors: their biology, pathology, and clinical behavior. It was at MGH I began a collaboration with Fred Hochberg on primary CNS lymphoma which over about a decade culminated in two large papers, some smaller ones, and one international mini-symposium (as part of the XIVth International Cancer Congress). I also worked for the first time on animal models of tumors, doing a carcinogen-induced malignant Schwann cell project with Bob Martuza when he was a junior Assistant Professor (and now he is Chair of Neurosurgery at MGH), and examining the pathology of tumors implanted as xenografts in flank tissues and treated with light-sensitizing dyes and then illumination. I have spent a lot of time over the years working on animal brain tumor models starting from these beginnings in residency.

After finishing residency I worked for 3 years (more or less) at Robert Wood Johnson Medical School of the University of Medicine and Dentistry of New Jersey. UMDNJ-RWJMS had two main teaching hospitals (Robert Wood Johnson University Hospital, previously Middlesex General University Hospital) and St Peter’s Medical Center, plus minor affiliations with two other hospitals (one a VA institution). I did a lot of running around to do frozen section consultations between RWJUH and St Peters, and autopsy brain examinations at those two places plus for a brief time at Muhlenberg Hospital in Plainfield, NJ and for many more years at the Lyons VA Medical Center and at Cooper Hospital in Camden. The Neurology Department at RWJMS was (and still is, I think) heavily focused on movement disorders, so I was able to see a lot of Parkinson’s Disease, Progressive Supranuclear Palsy (I think 8 autopsy cases in 3 years) and other miscellaneous disorders while there. I had a small role in the discovery of alpha-synuclein as the main constituent of Lewy Bodies, as I autopsied a man from a family with autosomal dominant Parkinsonism, and it was my diagnosis of typical Parkinson’s Disease with Lewy Bodies that led, first, to the confirmation of the pathology in another family member (we requested the autopsy tissue from 1965), then to the working out by Larry Golbe and colleagues in Italy of the family tree of what became known as the Contursi kindred, and from that, identification of the mutation in the alpha-synuclein gene in that kindred and so the protein identification in Lewy Bodies.

I was involved in a new animal model tumor project while at RWJ, one that continued for some years after I left there. This was a project in the early days of transgenic mouse technology. Arnold Levine, then at Princeton University in the Molecular Biology Department but later President of Rockefeller University (at least for a while) had a project ongoing in which he and his post-doctoral fellow Terry Van Dyke were making transgenes with the large ‘T’ antigen of SV40. Their animals were getting brain tumors, which they first regarded as ependymomas (since they were in the ventricles) and then “learned” were choroid plexus “papillomas”. I was asked to help out with the tumor pathology, and I showed them that the tumors were malignant, ie choroid plexus carcinomas. I persuaded Dr Van Dyke to do a series with me sacrificing mice proven to have the transgene at a set of ages from well before the time at which they would show symptoms of a tumor or have enlarged heads, and with this we wrote a nice little paper showing how the choroid plexus in these mice generated many small tumors, which grew and coalesced into one or a few large ones. Dr Levine was a pioneer investigator into p53 and we looked at the expression of p53 in these tumors at different ages of development in this study.

As a few founding members of the Neuroplex will still remember, I was enticed into moving professionally from RWJMS to NYU by the late Joseph Ransohoff, then-Chair of Neurosurgery at NYU, whom I met at the Cancer Congress mentioned above in Budapest, Hungary in 1986. Joe was one of the great characters of 20th Century American medicine, and one of the world’s great neurosurgeons and trainer of neurosurgeons. He convinced me to move to NYU where I joined Gleb Budzilovich in the Division of Neuropathology. For the next 20 years, first with Joe as Chair of Neurosurgery and then with Patrick Kelly, another master neurosurgeon, I was kept busy and happy making diagnoses on hundreds and hundreds of brain and spinal cord tumors, and doing research and writing about them. I was able to work with Fred Epstein, a great pioneer in pediatric neurosurgery and in radical excision of intramedullary spinal cord tumors, work which again was a clinical-pathological collaboration which produced a number of important papers. I also assembled what was at that time probably the largest series of gangliogliomas in the literature and we published that in back-to-back articles (pathology and then clinical features) in J Neurosurgery.

When I first came to NYU the Division of Neuropathology, which had its own laboratory and suite of offices in Bellevue, was run by Gleb Budzilovich, although the formal title of Director of Neuropathology was retained by John Pearson, who was also Director of Pathology for all of Bellevue. Irwin Feigin had been pushed to retirement by NYU rules before I came (this was before age discrimination made such things illegal) but he retained a Bellevue appointment and for some years I shared office space with him. Humberto Cravioto was also a member of the Division. As noted below David Zagzag, who was trained by me with Gleb, Humberto, and Irwin, was added to the faculty after his residency, as by then Humberto did only a little autopsy neuropathology and no surgical neuropathology, and Gleb and I needed a another surgical neuropathologist. In 1994 Gleb retired, and Humberto died then or a little thereafter. Irwin was also pushed into giving up his Bellevue appointment and moved out of his desk space. John Pearson tried doing active clinical neuropathology again, but found that his tasks as Director of Pathology for Bellevue, and the years he had spent away from doing neuropathology, made this too difficult, and he hired Bruce Quinn fresh from NP training at UCLA. This didn’t work out well and Bruce left after only 3 years. David Zagzag and I struggled along with only the two of us, while I worked at persuading Vittorio Defendi, our Chairman, to hire another neuropathologist. We interviewed a lot of people, but hired noone except a neurologist who did muscle pathology, Jack Danon. Jack didn’t last too long either as his Neurology appointment, which was primary, didn’t work out that well. Finally I persuaded Vittorio to hire George Kleinman, who also became the Director of the Autopsy service. This was a thankless task, and George gave up on us and moved to Mt Sinai after about 4 years. After that it was just David and me, until I left at the end of November 2007.

While at NYU I had fruitful collaborations with some basic scientists, most notably Elizabeth Newcomb. With Max Koslow, who was head of neurosurgery for Bellevue within the NYU system, and Fred Lang, then a neurosurgery resident and now a major figure in glioma surgery and research at M D Anderson, Elizabeth and I put together a whole series of studies of genetic alterations in gliomas, with studies of p53, p16, mdm2, EGFR, mis-match repair enzymes, and p14ARF in adult and pediatric high grade gliomas. Some of these studies helped establish the major paradigm for classifying glioblastomas genetically that was paramount during the 1990s: those tumors with p53 mutations, usually arising from lower grade gliomas (we called these “progressive pathway glioblastomas”, Paul Kleihues preferred “secondary glioblastomas”), and those with normal p53 genes but amplification of the EGFR gene (what we called “de novo glioblastomas”, and Kleihues liked “primary glioblastomas”). Elizabeth later moved more into studying effects of chemotherapy agents on glioma cells in vitro and in animal models, and I helped out with electron microscopy of cultured tumor cells (establishing that they did not die by apoptosis so much as by autophagy) and with tumor pathology in the mice.

As a “general” neuropathologist I was involved in all sorts of things at NYU other than tumors. Perhaps the most important of those was dementia pathology, particularly Alzheimer’s Disease. In the late 1980s the Psychiatry Department had been pushing for an NIA grant for an Alzheimer’s Disease research center grant, and I was recruited to help write the grant for the neuropathology core portion. Initially we were rejected but we negotiated a relationship with the late Henryk Wisniewski and his NY State Institute for Basic Research, and benefitting from that relationship we obtained funding for a “core center”. I then collaborated for quite a few years with Henryk’s junior associates, especially Jerzy Weigel, in several rigorous studies mostly counting neurons and tangles in serial whole coronal sections of hippocampus from AD brains. The results tied nicely to clinical dementia scales developed and used by Barry Reisburg from NYU Psychiatry. I also did a lot of neuropathology/neuroradiology correlation studies in AD with Mony DeLeon of the ADRC, and I was the neuropathologist for a nice little study of brain biopsies in patients undergoing shunting for Normal Pressure Hydrocephalus, with a (then) young NYU neurologist, Jamie Golomb.

Of course an important part of my work at NYU was training younger neuropathologists. When I arrived there William Harrington was the NP Fellow, and I helped train Bill for about a year, after which he spent an additional year as a research fellow working with Roberta Hayes on glioma immunology. After Bill Gleb Budzilovich and I trained Maria Milcu, and David Zagzag, whom we convinced the Department to hire as an Assistant Professor (again with the strong assistance of Joe Ransohoff from Neurosurgery). David was junior faculty when we trained France Berthelet for a year (she had done one year of NP in Canada but her mentor became ill and we accepted her for her second year), and later we had Suash Sharma (now at the Health Sciences University of Georgia/Medical College of Georgia), Charles Shao (now at SUNY-Downstate and a Neuroplex member for many years), Hope Wu (now the neuropathologist at Geisinger in Pennsylvania), Codrin Iacob (a Neuroplex member), Mary Fowkes (now at Mt Sinai and also a member of the Neuroplex), and Ingeborg Fischer (now practicing NP in Switzerland, and board-certified not only in the US but there). We also had Souhel Najjar for a year until he gave up on us and went back to clinical neurology; Souhel ended up as an epileptologist and he and I have collaborated on at least one little study since that time. Training neuropathology fellows or residents led me to training general pathology residents, and I was Director of the AP/CP Residency at NYU from 1997 to October 2004, so I have many more “academic children” to be proud about apart from my NP trainees. I am still doing this, as I am now Residency Director at my current faculty post in Missouri (see below).

I worked at NYU for just over 20 years, rising in the academic ranks from Assistant Professor to Associate Professor with tenure to Professor, the last in 2002. I held a joint appointment in the Department of Neurosurgery for all of that time, a position started by Joe Ransohoff and then continued when Patrick Kelly became Chairman after Joe retired from NYU. I taught Neurology and Neurosurgery residents on a weekly basis (or more frequently, often) for all of those years, in addition to Pathology residents. I also taught medical students. At NYU medical student education in pathology went through a number of evolutions, with neuropathology either the last or, most of the time, the first specialty area in pathology to which the second year medical students were exposed. We had formal lectures (a dozen or more each year) of which I gave more than half for most of my 20 years, splitting the workload with Gleb Budzilovich, David Zagzag, George Kleinman, and, episodically, some of our fellows. At some point NYU shifted from a Pathology Course to sets of Pathology lectures distributed in an organ-system disease curriculum (?”Mechanisms of Disease”?) and so for a considerable time Neuropathology was taught alongside Neurophysiology; so I worked closely with Kerry Walton, the Course Director or Module Director (different titles at different times) to coordinate lectures and laboratory sessions. The latter kept dwindling as the School of Medicine cut back on curricular hours.

Finally, for a variety of reasons not to be explored here, it became time for me to consider leaving NYU, and giving up my two-hour one-way commute from central New Jersey. I made the decision to start looking at some time in 2006, although I had been thinking about it for a longer period of time. I took my time and looked at several positions, and found a good place to go to here at the University of Missouri. The Chair of Pathology & Anatomical Sciences (that’s one department here) is Douglas Anthony, who is a neuropathologist, whom I knew from AANP meetings and because he had previously worked in Boston at the Brigham and at Children’s; in fact we had shared a couple of cases over the years. Dr Anthony and I hoped that in coming here I would provide quality neuropathology clinical services and teaching to the pathology residents, replacing Linda Spollen, who retired after quite a number of years here. I think that has worked out well. We also thought I would be active in research, and while that has not gone as fast as originally thought, I now have an active laboratory in our Center for Translational Neuroscience, and am involved in collaborative projects involving brain tumors, stroke, and other matters. I continue to have good material for case report publications with neurologists and neurosurgeons, and a little bit of basic or translational science as well. What neither of us planned for was that early in 2009 the Director of our Residency Program left us, and Dr Anthony asked me to take on that responsibility. This has cut back a bit on my free time for research, as running even a small residency program takes a lot of work these days.

Moving has had other benefits. One is the 15 minutes it takes to get to the hospital, quite a change from the 2 hour trek I put up with for 20 years. Another was that I had time (working a lot of weekends, admittedly) to finish up the book I had started when I was at NYU. Cambridge U Press had approached me about editing a neuropathology text, and I negotiated with them to instead write it all, a single-author text, limited to surgical NP. I presume all of the Neuroplex members know of Modern Surgical Neuropathology (a title picked by them: they have a series, for example Miettenen’s book on soft tissue pathology is “Modern Soft Tissue Pathology” or something like that), which came out in July 2009. The book has been received favorably with mostly strong reviews, and it won the First Prize in the 2010 British Medical Association book competition in the Neurology category, over such books as the latest edition of the Adams & Victor Neurology text. I have also been asked to do several book chapters for other editors, and one of those was with Hope Wu, a chapter in a broad immunohistochemistry handbook from Geisinger that just came out this past month. Two others will come out within the next year (so I hear) in volumes of a series of books on CNS tumors produced by Springer.

The University of Missouri is a rather extraordinary place in that on one large campus we have the medical school, the graduate school, the undergraduate colleges, the veterinary school, and a research nuclear reactor, as well as several multidisciplinary free-standing institutes including a cardiovascular research center and a nanomedicine center. My collaborations extend to the veterinary school and to the research reactor as well as involving graduate students from Biology and Chemistry. It is an exciting place to work, and I anticipate doing a lot more here. I retain my Neuroplex charter membership, and I hope the organization stays active.