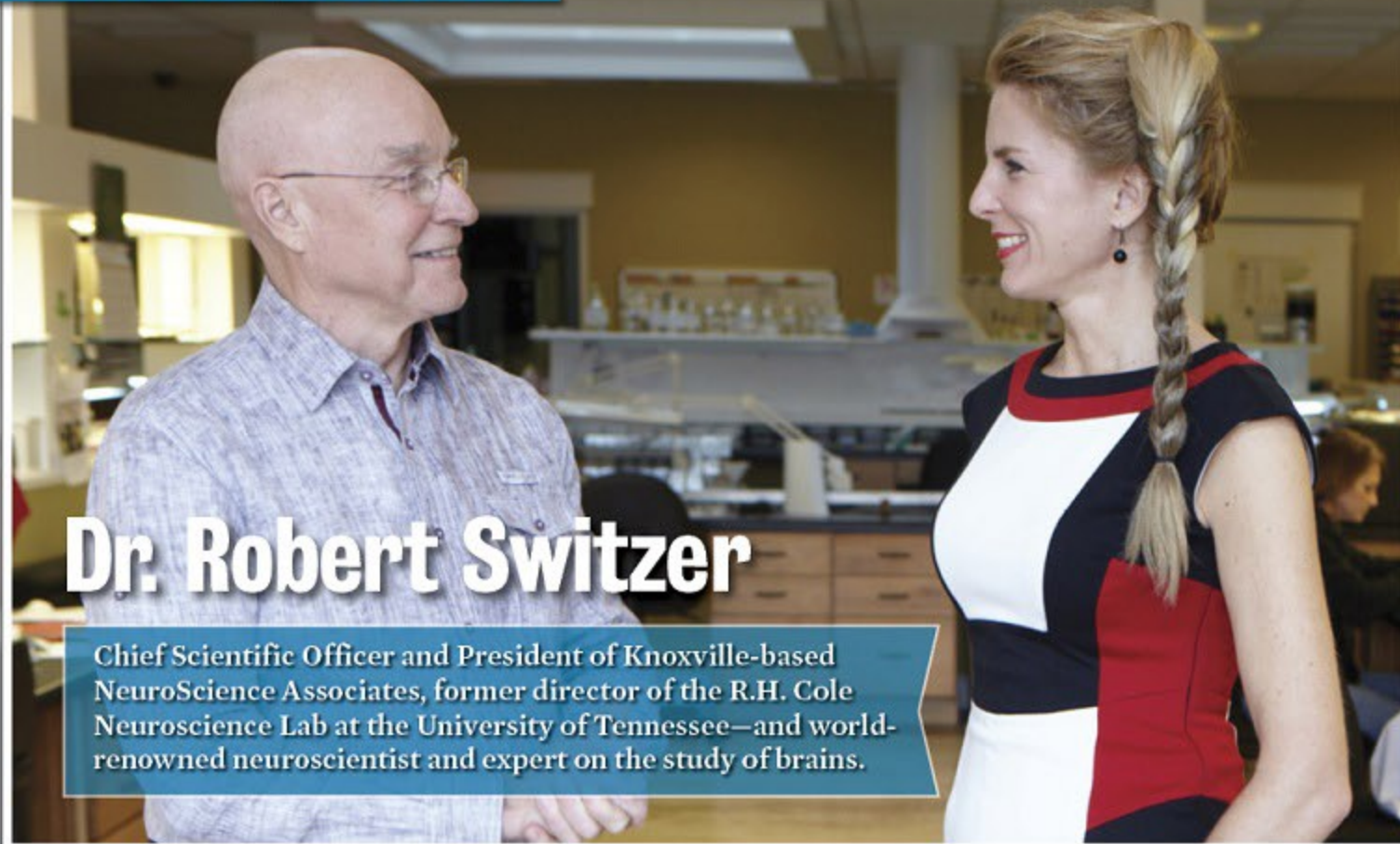


Photograph By Tyler Oxendine



Dr. Robert Switzer

Chief Scientific Officer and President of Knoxville-based NeuroScience Associates, former director of the R.H. Cole Neuroscience Lab at the University of Tennessee—and world-renowned neuroscientist and expert on the study of brains.

DR. ROBERT SWITZER and his company, NeuroScience Associates, provides neurohistology services (*neuro*: relating to nerves or the nervous system; *histology*: the study of the microscopic structure of tissues)—that is, the study of brain tissue—to scientists around the world. His revolutionary work assists in the study of brains for the discovery of cures for diseases such as Alzheimer's, Parkinson's, and Huntington's. He has designed FDA-approved studies of the brain, invented a patented technology to study multiple brains simultaneously, authored more than 40 manuscripts for peer-reviewed journals, published more than 50 scientific meeting abstracts, and contributed to seven books. Here, Angelique Medow and Dr. Switzer discuss the extraordinary work occurring at the NSA labs in West Knoxville.

ANGELIQUE MEDOW: You are a fascinating combination of both a world-renowned neuroscientist and a successful businessman. Aren't the scientific and business worlds very different?

DR. ROBERT SWITZER: Yes—very different. I'm a neuroscientist at heart, but I've always had an interest in business. When I started, it was unheard of for a neuroscientist to start a business. But I thought, "Why not?"

AM: Why did you decide to study brains?

RS: The structure and function of the brain is just irresistibly fascinating. To study the brain accurately, we must study tiny, thin slices, because every slice (or section) is different. A person could study one section of the brain and it could appear normal, and the next section of the very same brain could show a significant issue. Each section is vitally different and important.

AM: What thickness are the slices of the brain to be studied?

RS: Thirty to 40 microns—one-third the width of a human hair.

AM: How long does it take to section a whole brain?

RS: Well, the rest of the world still sections one brain at a time, which takes up to two-and-a-half hours. Since there are hundreds of brains in any given study, there can be a one year bottleneck in getting all sections of this many brains studied. Here at NSA, we are the only lab in the world that uses our MultiBrain Technology, which allows us to section 25 brains in the same two-and-a-half hours that it takes other labs to section only one brain.

AM: How does your lab's ability to provide brain sections 25 times faster than the rest of the world affect the average person?

RS: Our ability to reduce the time it takes to section a brain reduces the time it

takes to get sections from these brains to the pharmaceutical companies for study. This reduces the time it takes to create the drugs to combat diseases. Ultimately, if someone you love has one of these diseases, our technology could help prolong their life by getting them the right drug more quickly.

AM: How does your MultiBrain Technology affect science and scientists?

RS: Our technology gives scientists time to focus on what they do best: Design and conduct experiments, analyze the sections and write reports. We affect science by streamlining the analysis and getting the results to the drug companies, medical community, and people with diseases more quickly.

AM: Can you give me an example?

RD: Pat Summitt's case is a good example. She discovered she had Alzheimer's at an early stage, when she had what is called Mild Cognitive Impairment (MCI)—a stage at which medications could really help. To discover such medications, mice models of Alzheimer's disease are used. One of the hallmarks of the pathology of Alzheimer's disease is the "neuritic plaque." These are patches in the brain where there is an abnormal accumulation of amyloid proteins. The greater the number of neuritic plaques, the more severe is memory loss and dementia. With MCI there is a lower number of neuritic plaques and the hope of researchers is that being able to halt or reverse this amyloid accumulation will halt the progression of the disease. The mouse models mimic the ever-increasing accumulation of amyloid, so promising medications can be administered to the mice to see if the amyloid accumulation can be changed. For the past 10 years, we've facilitated this research. Our work can accelerate the number of promising drugs that can be tested.

AM: What does your company provide to the world?

RS: We section brains sent to us, apply stains as needed, and ship the sections. Scientists also use our stain to apply to sections they are working on. We also provide sectioned brains to pharmaceutical companies and offer assistance to companies that want their study to be reviewed and approved by the FDA. In addition, with the opening of our newest facility (now under construction), we will also provide scientific study of the sections and reports on the findings.

AM: You don't provide the process, just the service?

RS: Right. Execution is paramount, so we do not sell kits or the process. Companies buy our service. We also don't have any animals, do animal testing, or have the chemicals used for that process.

AM: You already have a successful business sectioning brains. Why provide scientific study of the sections and reports on the findings as well?

RS: Currently, much of the rest of the world is studying brain sections by computer analysis. Computer analysis is good, but I believe that we cannot completely remove the human element from observations and have a completely accurate study. Until computers can acquire the visual recognition that a pathologist has after years of experience, computers will miss things. A computer may not recognize a significant anomaly. Again, like the transformation from single-brain to multi-brain sectioning, there has to be a better way to study brains. And I believe that better way includes the use of not only our computers, but the use of our own well-educated, experienced, human brains. Perhaps the same technology used for facial recognition can be applied to neuropathology.

Angelique Medow is a 2012 Cityview Entrepreneur and the Principal of Building Ideas, which provides design, decorating, consultation, and project management for commercial and residential properties. She also enjoys exercising her degree in journalism from Arizona State University.