

# Profiles in Versatility

## His Expert Opinion: Patents and Physics Make Great Partners

By Alaina G. Levine

**Editor's Note:** This column is the first of a series that will profile people trained in physics who have gone on to make their mark in a variety of careers. Physics departments have long argued that a major in physics is excellent preparation not only for academia but for many other career opportunities as well. In this series APS News will illustrate the versatility of physics with some real-life examples.

Robert J. Rose has a passion for patents. As Managing Partner of Sheldon Mak Rose & Anderson, a boutique intellectual property (IP) law firm in Pasadena, California, this physics-educated professional has the opportunity to pursue his passion on a daily basis. And the best part of his job is knowing that his physics background gives him the advantage to deliver superior service to his clients.

"Physics is perfect training for law," Rose says. "Law school trains you how to think. You have a jump start on that training when you have learned how to think like a physicist."

Furthermore, "as a physicist, we are always looking at things as a reductionist," he says. "We are always asking of any physical phenomenon: what underlies what we're seeing, what's the cause? This is a very good skill to know as a lawyer."

Of course, he didn't always know he wanted to be an attorney. His heart was set on physics from a young age. "It was the subject in high school I enjoyed most," Rose recalls. "I had the opportunity to work on holograms at a laboratory at the University of Miami and it was like working with magic. I just wanted to continue."

He nurtured his enthusiasm in the desert, enrolling at the University of Arizona in Tucson. When Rose received his Bachelor's of Science in physics and astronomy in 1971, he was certain he was destined for a career

as an academic astrophysicist. While in graduate school at the University of Colorado, he witnessed demonstrations against the Vietnam War and realized that his love of and skill in physics could be channeled in a different way.

"I became intrigued by legal issues and the politics surrounding the war," he says. "The draft took some friends and acquaintances, and while I had a high number [in the draft lottery], I think the draft made the war much more personal."

He took the LSAT and did well. He spoke with his advisor and decided to take a year off from graduate school to try law school. The advisor "thought I was crazy and didn't have very nice things to say about lawyers," Rose says.

Returning to the UA for his legal education, Rose instantly found success. "I was good at law school," he says. He recalls how he and other law students who had training in physics and other scientific disciplines excelled in their studies, while those with social science backgrounds struggled with the logical nature of the subject. To this day, Rose stresses "the single most important class you can take as an undergraduate in preparation for law school is symbolic logic," he says. "The more classes you take that require precise logical rigorous thinking, the better you are prepared for law school, and life too."

He easily graduated with high distinction, Order of the Coif, and was an Associate Editor of the Arizona Law Review. After receiving his JD, Rose was selected under the Attorney General's Honors Program to be a Trial Attorney with the Antitrust Division of the US Department of Justice. Later he served as a Special Assistant United States Attorney in the

Central District of California, and as Senior Litigation & Antitrust Counsel and Assistant Secretary of Twentieth Century Fox Film Corporation.

Today, he helps clients at the forefront of scientific research. He is involved in a variety of aspects of the IP protection process. He works with clients to evaluate and prepare their patent applications and handles all communications for them with the US Patent and Trademark Office, including any needed appeals. In addition, Rose often does extensive state-of-the-art research. He is often asked to ensure that there is no patent infringement, or to review the



science behind an innovation. He is quick to emphasize his education in physics (as opposed to other scientific disciplines) is especially helpful in this respect.

"Physics training gives you very broad exposure to scientific principles, so no matter what area of science or technology we are dealing with, I have information to draw on," Rose says.

The work of a patent lawyer can also involve litigation, as well as licensing analysis, in which a technology is identified and patented, and the attorney tries to identify potential licensing opportunities for the innovation.

Rose's favorite component of

his vocation is preparing expert opinions and working on design around studies, which he joyfully refers to as an "intellectual feast". In providing opinions about the validity of patent claims, from examining the legitimacy of the science to researching who is the rightful owner of the patent, Rose draws upon his physics background. Design around work, he says, is "where you get to really apply a crossover between scientific and legal knowledge so you can come up with ideas for a client that make both practical and technological sense."

Rose cites a recent opinion project in which he was involved. The client was an academic institution. Within the university, one researcher had secured a patent, while another researcher at the same institution claimed he should be credited as a co-inventor. Rose interviewed both individuals, examined their research notebooks, and established the sequence of events that led to the innovation. His opinion was that both could be considered inventors.

Rose says opinion work, aside from the intellectual stimulation involved in analyzing the problem at hand, is rewarding for another reason: the client appreciates it the most. "When preparing a patent, some clients may want the lowest price and not appreciate the value and the time you put into it," says Rose. "But with opinion work they are already worried about something, so when you guide them through the patent thicket they're very happy."

Although he has the chance to scrutinize cutting edge physics research, often before it is made public, Rose does sometimes miss being a researcher himself. "I miss the joy of discovery, the 'aha' moment," he says.

Of course, there are patent

professionals who have been able to forge opportunities in which to do research without abandoning IP prosecution. Albert Einstein, for example, was a patent clerk before he became an academic physicist. Some of his most profound and significant papers were produced while he was employed as an examiner in the Swiss Patent Office.

To develop new skills and to partially satiate his appetite for "doing" physics, Rose recently received a M.S. in Imaging Science from the Chester Carlson Center for Imaging Science at the Rochester Institute of Technology. His coursework included ultrasound imaging and magnetic resonance imaging, and his research project was on a method for segmenting nerves in ultrasound images during guided anesthesia.

Today, Rose's expertise lies at the intersection of physics and law, with patent litigation experience in such technologies as intraocular lenses, magnetic resonance imaging, computer graphics and digital image warping, flight simulators, and amusement rides. He is thrilled with his academic and professional decisions, recognizing his physics education has made him a champion in his industry.

"Physics is the premier base discipline upon which to prepare for any professional or scientific career. It is to the 21st Century what philosophy was in prior eras," Rose declares. "It teaches you the value of hard work, and it rewards that work with the keys to science, logic, and life. What more could you want?"

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## Grave Concern About Earth Observing Satellites at Science Committee Hearing

"Flying blind" was but one of the terms that House Science and Technology Committee Chairman Bart Gordon (D-TN) used at a February Congressional hearing to describe the nation's rapidly deteriorating system of Earth observing satellites. Gordon's assessment was shared by committee members on both sides of the aisle during this review of a National Research Council report, *Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond*.

"The United States' extraordinary foundation of global observations is at great risk," the NRC report declared. "Between

2006 and the end of the decade, the number of operating missions will decrease dramatically and the number of operating sensors and instruments on NASA spacecraft, most of which are well past their nominal lifetimes, will decrease by some 40 percent."

One of the major problems highlighted at the hearing was funding. Study co-chair Richard Anthes, president of the University Corporation for Atmospheric Research, testified that "while societal applications have grown ever-more dependent upon our Earth-observing fleet, the NASA Earth science budget has declined some 30% in constant-year dol-

lars since 2000. This disparity between growing societal needs and diminished resources must be corrected." The report's "overarching recommendation" is that the US government, working in concert with the private sector, academe, the public, and its international partners, should renew its investment in Earth observing systems and restore its leadership in Earth science and applications.

Also on hand at the hearing was Anthes' co-chair, Berrien Moore III, director of the Institute for the Study of Earth, Oceans and Space at the University of New Hampshire. Moore told the committee that "at a time of unprecedented

need, the nation's Earth observation satellite programs, once the envy of the world, are in disarray." After describing the difficult choices that the NRC committee made in narrowing more than 100 suggested future mission concepts into a far more limited set of recommended missions for the next decade, Moore explained that "the recommended NASA program can be accomplished by restoring the Earth science budget in real terms to the levels of the 1990s."

Moore described NASA's out-year Earth science budgets as fundamentally flawed and "totally inadequate to accomplish

the decadal survey's recommendations." The NOAA budget outlook is mixed, Moore said, and assessing it over the long term is difficult because it "is far from transparent."

First conceived in 2004, the report was conducted at the request of the NASA Office of Earth Science, NOAA National Environmental Satellite Data and Information Service, and the USGS Geography Division. The full text can be accessed at <http://books.nap.edu/catalog/11820.html>.

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