

Steve Smith

Research and consultation in the physical sciences

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In Brief:

Hello. I'm Steve Smith.

I am a Consulting Scientist.

Inventors often need my services.

New ideas occasionally encounter problems.

False Data can cause unwanted problems to persist.

I am an expert in taking apart problems and uncovering False Data.

I have broad capabilities in physics, chemistry and electronics.

A more detailed resume follows.

Current activities

Doing research and development of specialty materials under contract to several companies in various industries.

Developing marketing strategy for a product of which he is a co-inventor: A nicotine-delivery element called the Satisfactor™, which delivers [to one accustomed to smoking cigarettes] the sensation of satisfaction, without any first-hand smoke, second-hand smoke, or burning tobacco at all. A Satisfactor is placed on the tongue where it immediately dissolves or disintegrates, releasing a pulse of nicotine which ultimately delivers the sensation of satisfaction. This technology may also deliver other materials such as caffeine.

An active member of the CALCE Tin Whisker Group, one of a government-industry team dedicated to developing technology to mitigate and ultimately eliminate the

damaging effects of these microscopic metal-crystal growths, which have cost us a billion dollars worth of satellites and ground-based electronic systems in the last ten years. His current project is the development of an elastomeric Whisker-Tough™ conformal coating for electronic circuit boards that will resist puncture by these needle-like metal whiskers.

One particularly interesting recent research program involved developing more stable emulsions. There are many uses of emulsions in our society, ranging from cleaners to water-borne versions of older solvent-borne products such as commercial wood preservatives, to latex paint, asphalt and beyond. Emulsions have many different failure mechanisms. These are known as coalescence, flocculation, creaming and Ostwald ripening. Understanding emulsion failure mechanisms is the basis of developing more stable emulsions.

Since 1972, Steve Smith has also been President and Chief Scientist of Smith & Co. The company currently operates in a 20,000 square foot facility, and manufactures its own specialty epoxies and polyurethanes that are sold internationally for applications in the marine and construction industry, as well as for maintenance and restoration of commercial and residential property.

Steve Smith is an expert in taking apart problems and uncovering False Data.

Education and past Experience

Steve Smith received both a BA and Masters in Physics from San Francisco State University. His graduate work included research in plasma physics and related areas. In 1967 he became Chief Engineer at Pacific Instrument Company, the company for which he began work as an assembly technician in the summer of 1959 and summers thereafter. Pacific Instrument was at that time one of the only two companies in the country that were formally qualified to make some of the highest-reliability magnetic components [transformers, inductors and saturable reactors]. It was there that he first learned how to make and later how to design these components and, ultimately, how to improve their design and manufacture.

From 1968-71 he was Director of Research at FAM Engineering, responsible for the development of solid-state versions of power-supplies and modulators for microwave tubes, typically 100 and 200 watt-continuous and kilowatt-pulsed traveling wave tubes and their associated magnetic components. The then-current versions of these power supplies used primarily vacuum tubes. His design projects included development of a solid-state D.C.-coupled anode modulator for a traveling wave tube operating at 10KV.

He then became a Senior staff Consultant with Fairchild Integrated Microsystems and for three years was responsible for various projects among which were:

Operating responsibility for Fairchild's Captive Line for Martin Marietta, which was producing a family of 23 hybrids that comprised the seeker head control electronics for an air-to-air missile.

A member of the team that designed and produced the first high-reliability fly-by-wire aircraft flight control system.

Other projects included:

Design, development and production engineering of RF preamp and decoding logic for a portion of a search-lock ECM system and implementation in hybrid form. The complexity of the system was 3 hybrids containing 20 integrated circuits including ECL logic.

Design engineering, development and implementation in hybrid form of circuitry to replace relay and triac logic in vending machines. The project included designing 1500-volt transient immunity into units and invention of a planar photocoupler suitable for hybrid implementation. Complexity of the system was 2 hybrids, 30 transistors.

Design, development and production engineering of a state-of-the-art four-channel high-speed pulse amplifier and digital processor for spark chamber signal analysis. The system had sub-millivolt sensitivity, could discriminate 20-nanosecond pulses and would withstand five-kilovolt noise spikes on its inputs. It required eight active trims. The project included designing the control interface with the laser trimmer. The complexity was two hybrids, 16 integrated circuits.

From 1972 to 1987 Steve operated his own research and consultation business. Some of the projects during that time included:

A 2.5 megawatt modulator for a crossed-field amplifier used in a moving-target-indicator radar.

Research over a period of several years on the philosophy of design of DC-to-DC converters and switching regulators. Holds six patents in this area.

A continuing research and development effort producing a number of state-of-the-art pulse transformer and modulator designs for gridded traveling wave tubes.

A study program for a major manufacturer of cans and jar caps led to the development of an extremely sensitive acoustic resonance method of detecting defects in jar caps moving at over ten per second past a scanner.

Development of technology for the isolation of harmonic currents (normally generated by the rectification of the A. C. power line) from circulating in the electrical power grid. Holds four patents in this area.

An optimizing element capable of controlling and optimizing the operating point of any nonlinear system. This can maximize or minimize any system variable of anything, and is based on fundamental mathematical principles.

A microwave interferometer to detect movement in the earth on the order of .03 inches around a 500,000-square-foot excavation site.

A design for a scanning spectrophotometer covering the near-ultraviolet to the near-infrared portion of the electromagnetic spectrum. The design featured one to two angstrom resolution and the ability to perform a full scan in ten milliseconds.

Invention of an optimization algorithm for the design of transformers or inductors that maximizes the energy-handling ability in a volume of arbitrary shape. This was published in his book Magnetic Components.

His degree in Physics and comparable experience in chemistry made it possible for him to establish a chemical production business in 1972. His products cure paint failure. He invented The Modern Technology that Restores Deteriorated Wood. Smith & Co. was founded with the intention of providing the finest quality adhesives, sealants and coatings to the public for boat construction and maintenance. Reputation grew by word-of-mouth, necessitating production space to expand to the present 20,000 square foot facility in order to provide products to customers in America and as far as Kwajalein and Stockholm. The company serves the marine market as well as the larger architectural maintenance and restoration market. Consequently, Steve Smith has considerable experience with wood, water and interfaces. In 1987 Smith & Co. became his sole focus, and the company continues operation today.

In 2004 he began again to do research and development and consulting, which is now his primary occupation.

Publications

“Methods of using Boron Nitride in Conduction-Cooled Electronic Units”, Insulation, July 1969

“Insulate and Heat Sink with Beryllia Mount”, EDN, December 1969

“Airborne Power Supplies for TWTs”, EDN August 1971

“Factors in Designing TWT power Supplies”, EDN January 1975

“A High-Speed Proportional Feedback Switching Circuit”, Solid State Power Conversion January/February 1979

“Eliminating Power Supply Interactions with Pulsed Loads”, Invited Paper, 1979 Powercon 6, Miami Beach, Florida

“Designing High-Power Converters for Very Low Output Noise”, Invited Paper, 1980 Powercon 7, San Diego, California

“Applying Optimization Methods in the Design of Linear Power Magnetics”, Invited Paper, 1982 Powercon 9, Washington, D.C.

“The Use of Logic in the Design of Power Processors”, PCI, January 1984

“Universe of Ideas” monthly column in PCI, 1984-86

Magnetic Components, Design and Application Van Nostrand Reinhold 1984

A great deal of chemical and physical applications technology was published on the Internet as it developed. A major paper is published at www.woodrestoration.com. Many articles and essays are published as links or references from www.smithandcompany.org.

References:

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Letter of Recommendation for Steve Smith

I have used Steve Smith as a consultant on an aerospace project for two years now. When I first funded him, I was looking for application specific knowledge that the rest of my project team lacked. I have used a number of consultants over the last 15 years, and like to choose those with a proven track record, and generally some sort of national recognition among their peers. Steve, through Smith & Co, had created and manufactured 29 proprietary adhesives, sealers, and paints over a period of 30 years. I had bought some of his products in the past and they were really superior. So, I expected a lot of capability from him. However, my expectations were substantially exceeded. My team was working on a problem that required the development of a new material with properties that had yet to be completely defined or understood. We initially thought Steve would just be the “material developer guy”, We quickly discovered that Steve was much more. With his impressive knowledge base for both physics and chemistry, he quickly became our principal investigator. Not only that, when we funded Steve we funded Smith & Co. So, we benefited from the speed and agility of a small manufacturing company for rapid prototyping to quickly try new ideas. Some of you reading this are probably thinking “Heck, I know places that fit that description”. Indeed, I do too. Even at my work site, we have over 6000 engineers and scientists, with a huge amount of graduate degrees and experience, and several hundred laboratories. However, Steve doesn’t fit the standard definition of just another smart guy. He is a most prolific thinker, and the rate and consistency with which his mind processes various issues for solving a problem is quite amazing. His mind seems to be on fast track all the time. He has been inventing, developing, and manufacturing products for more than 30 years, and he has a broad knowledge of all aspects of that game. He is also backed up by some real intellectual horsepower at Smith & Co. Combined with Steve’s very obvious insatiable love of science, he is not just multi-talented, he is incredibly talented. He is a very good team player, and is quite skilled at interacting with other technical professionals. He is a good person to have as a consultant, but Steve brings so much to the table that the term consultant seems to be rather inadequate.

The paragraph above dwells a bit on Steve’s talents, though if he had told me that himself before I knew him, I wouldn’t have believed. So, what kind of person heaps praise on Steve? I’m a 62 year old engineer who has spent his whole life working in the aerospace industry, with the exception of the 10 years in college and grad school to pursue electrical engineering, geophysics, and management science. Steve Smith is one of the most uniquely talented individuals I have ever met. That’s not praise; that’s a fact.

Bill Rollins, 11/19/07