

James W. Kronberg
Owner and Founder, VantorBridge LLC
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Education:

1. M.S., Electrical and Computer Engineering (Physics minor) Clemson University, May 8, 1981.
2. B.S. *cum laude*, Electrical and Computer Engineering (Physics minor). Clemson University, May 11, 1979.
3. U.S. Air Force Course OBR3031, Communications Electronics (32 weeks); Keesler AFB, Mississippi. Honor Graduate, February 22, 1974.
4. 24 semester hours' graduate work toward M.S. in organic and polymer chemistry; cut short when ordered to USAF active duty as the result of an ROTC commitment. Clemson University, 1971-1973.
5. B.S. *cum laude*, Chemistry (Geology minor). Clemson University, May 7, 1971.

Primary field of specialization, and major accomplishments which demonstrate this:

I do not limit myself to a single traditional "field of specialization", since I have found it is in drawing upon concepts from multiple fields that opportunities for innovation most frequently lie.

My academic training is in chemistry (B.S. 1971) with a geology minor, and electrical engineering (B.S. 1979, M.S. 1981), with a physics minor.

I have taught at the college level in both classroom and laboratory settings, and am adept at technical writing and preparing training packages and graphic presentation aids. While my chief job responsibilities since leaving school have involved electrical engineering, I have also been active in mechanical, chemical and software engineering, materials properties and fabrication, optics, medical and energy technologies and interdisciplinary fields, and have developed teaching and seminar materials covering topics in several of these areas.

Major accomplishments are summarized in the following sections. Most significantly, I am currently named as inventor or co-inventor on fifty-five issued United States patents as listed in a later section. For the great majority of these inventions, I carried out or participated in all four of the main stages of invention: conception, reduction to practice, preparation of the application figures and specification, and defense of the claims before the U. S. Patent and Trademark Office (U.S.P.T.O.).

My inventions have been featured in Popular Mechanics magazine; in Design News magazine; on National Public Radio; on WAGT, Augusta, GA "News at 11"; in Savannah River Site (SRS), Equitech International, Healthonics, Inc., and MedRelief, Inc. promotional and advertising materials; and were the basis for the patented MedRelief[®] medical electronic device technology on which Healthonics, Inc. and MedRelief, Inc. were founded.

Work Experience: Position Held; Dates; Technical Activity and Responsibility; Supervisor; Reason for Leaving.

1. Owner and founder, VantorBridge LLC. February 26, 2015 (company established) to present. Technology and patent application consulting and technological problem solving. Work with prospective inventors and small businesses and their patent attorneys to help develop new technologies, conceive and identify potentially patentable inventions, reduce them to practice, and prepare patent application specifications and figures. Work closely with attorneys to complete patent applications and defend claims against U.S.P.T.O. office actions.

Supervisor: None; self-employed consultant.

2. Instructor, Electrical Engineering Technology, Aiken Technical College. January 4, 2010 to August 8, 2016. Taught basic AC and DC circuitry, digital and analog electronics, semiconductor devices, integrated circuits, and other courses as assigned. Developed classroom presentation aids and laboratory exercises as needed. Attended instructor training for Project Lead The Way Principles of Engineering (POE) and Digital Electronics (DE). Attended NABCEP training resulting in certification for Solar Energy Installation. Also, August 11, 2010 to January 9, 2013 served as Academic Coordinator for Electronics Engineering Technology and Engineering Graphics Technology.

Supervisor: Tracy Pierner, Dean of Technical Education (January 4, 2010 – September 27, 2012); James “David” Deal, Department Chair, Industry and Skilled Trades (Sept. 27, 2012 – Jan. 5, 2015); Dr. Joy L. Watson, Dean of Technical Education (Jan. 5, 2016 – August 8, 2016).

Reason for leaving: retired from teaching at end of 2016 summer session to devote full time to VantorBridge LLC.

3. Adjunct Instructor, Electrical Engineering Technology, Aiken Technical College. March 23, 2009 to January 3, 2010. Took over teaching three courses in mid-semester spring 2009 from another instructor who left on short notice. Worked with South Carolina State University to help implement a cooperative education program offering SC State courses through the ATC campus.

Supervisor: Tracy Pierner, Dean of Technical Education.

Reason for leaving: hired as a full-time instructor beginning January 2010.

4. Chief Engineer, MedRelief, Inc. January 1, 2008 to March 18, 2009. Used multidisciplinary background and experience to support development and commercialization of new bioelectronic and other medical technologies and products. Reduced inventions to practice, and prepared patent applications for filing. Prepared, submitted and coordinated Premarket Notifications (510(k)'s) with the U.S. Food and Drug Administration. Helped implement Good Manufacturing Practices (GMP) and compiled Device History Files and Device Master Records for products prior to sales launch.

Supervisor: James Naftel, President.

Reason for leaving: MedRelief, Inc. was forced to close in March 2009 due to a lack of venture funding after the stock-market collapse of 2008.

5. Chief Engineer, Healthonics, Inc. June 22, 2000 to December 31, 2007. Used multidisciplinary background and experience to support development and commercialization of new bioelectronic and other medical technologies and products. Reduced inventions to practice, and prepared patent applications for filing. Prepared most graphics and information for Healthonics web site.

Prepared, submitted and coordinated Premarket Notifications (510(k)'s) with the U.S. Food and Drug Administration.

Supervisor: James Naftel, President.

Reason for leaving: Healthonics, Inc. was merged on January 1, 2008 into MedRelief, Inc., a Delaware company.

6. Lead Scientist for Electronics, Equitech Int'l Corporation. January 1, 1996 to June 21, 2000. Used multidisciplinary background and experience to support development and commercialization of existing products of the Equitech family of companies, and helped create new ones. Reduced inventions to practice, and prepared patent applications for filing.

Supervisor: Ron Floyd, CEO.

Reason for leaving: Equitech Int'l created a daughter company, Healthonics, Inc., to develop and commercialize its medical products.

7. Engineer, Technology Development Group, Savannah River Technology Center (SRTC), Equipment and Materials Technology Division. March 1, 1993 to January 15, 1996. (SRTC is now the Savannah River National Laboratory, SRNL, and a part of the Savannah River Site, SRS.) Used multidisciplinary academic background and experience to support SRS research programs and develop new technology. Reduced inventions to practice and prepared patent applications for filing. Coordinated with SRS Technology Transfer Group, outside groups and private-sector organizations to develop and commercialize SRTC-developed technologies. Served as Nuclear Incident Monitor Design Authority, March 15, 1993 to November 15, 1994. Named a Westinghouse Fellow Engineer, November 17, 1994.

Supervisors: Steve Tibrea, Jim Wong, Ivan Lewis (successively).

Reason for leaving: took a two-year Entrepreneurial Leave of Absence (ELOA) to work with Equitech International, which was founded in part on some of my inventions patented while at SRTC. Elected to remain with Equitech when the ELOA ended in 1998.

8. Engineer, Electronics Development Group, Savannah River Laboratory (SRL), Laboratory Services Division. June 16, 1981 to February 28, 1993. Used multidisciplinary academic background and experience to support SRS research programs and develop new technology, especially in electronic sensing and control for chemical processes and experiments. Reduced inventions to practice, and prepared patent applications for filing. Also served on Criticality Review Committee, 1985-87.

Supervisors: Joe Byrd, John Ufford, Dave Varn, Joe Whinghter, Dave Wilkerson (successively).

Reason for leaving: my work group was transferred between divisions and merged into another group during a 1993 reorganization as SRL became SRTC.

9. Graduate Teaching Assistant, Clemson University. January 5, 1981 to May 8, 1981. Conducted classroom teaching, testing and grading of 23 undergraduates in E&CE 202, "Linear Circuit Analysis"; prepared lesson plans, supplementary material and demonstrations.

Supervisor: John N. Gowdy, Professor.

Reason for leaving: awarded a Master's Degree in Electrical Engineering, May 8, 1981.

10. Graduate Research Assistant, Clemson University. May 21, 1979 to December 19, 1980. Tested and characterized CMOS integrated circuit logic devices at high temperatures (thesis work). Trained undergraduates in printed circuit fabrication and test procedures.

Supervisor: Lewis T. Fitch, Professor (Thesis Advisor).

Reason for leaving: the research grant expired. Clemson offered me a teaching assistantship while I finished work on my thesis.

11. Undergraduate Teaching Assistant, Clemson University. August 7, 1978 to December 15, 1978. Tutored Clemson University students and conducted laboratory sessions in FORTRAN computer programming.

Supervisor: J. Kent Bryan, Professor.

Reason for leaving: assistantship was for one semester only. Awarded a Bachelor's Degree in Electrical Engineering, May 11, 1979.

12. Combat Crew Communications Support Officer (rank of 1st Lt.), U.S. Air Force. November 17, 1975 to April 30, 1977. Trained flight crews on communications procedures, hazards and enemy interference; prepared training aids. Additional duties: Base Frequency Manager; Base TEMPEST Officer. Coordinated Kincheloe AFB TEMPEST ("compromising emanations") activities and radio frequency authorizations and helped resolve radio interference problems.

Supervisor: Daniel F. Herlong, Captain, USAF.

Reason for leaving: released from active duty due to base closure. Transferred to USAF Reserve and went back to college on G. I. Bill. Honorably discharged from USAF Reserve, January 18, 1985.

13. Communications Maintenance Officer (rank of 2nd Lt.), U.S. Air Force. February 25, 1974 to November 14, 1975. Coordinated and supervised the installation and maintenance of Kincheloe AFB, Michigan, radio, intercom, telephone, computer and intrusion-detection systems.

Supervisor: Larry G. Spindler, Major, USAF.

Reason for leaving: in 1975 the USAF Strategic Air Command (SAC) transferred all communications activities to the Air Force Communications Service (AFCS).

14. Graduate Teaching Assistant, Clemson University. August 9, 1971 to May 11, 1973. Supervised, tested and graded about fifty undergraduate students per semester in qualitative analysis, inorganic chemistry and organic synthesis labs.

Supervisors: various Clemson University professors responsible for courses I helped teach.

Reason for leaving: called to active duty in United States Air Force, effective July 2, 1973. Attended USAF technical school, Course OBR3031, Communications Electronics at Keesler Air Force Base, July 2, 1973 to February 22, 1974.

Major Accomplishments:

As Owner and Chief Engineer of VantorBridge, LLC:

Assisted clients in all phases of invention conception, reduction to practice, and patent application preparation and prosecution. See www.ventorbridge.com for a more detailed description of services available. Client confidentiality prevents the sharing of specific details except where shown as a matter of public record in issued or published patents. See my patents list below.

While employed at Aiken Technical College. (2009-2016):

1. Taught and updated a majority of the courses in the Electronics Engineering Technology (EET) curriculum. Also taught courses in other programs as needed, including extension courses on the ATC campus under the auspices of South Carolina State University toward a four-year EET degree.

A table of course numbers, titles and the semesters I taught them follows. Short descriptions of most courses, as approved for the South Carolina Technical College System, are at http://www.sctechsystem.edu/pgmmanagement_CAC/Catalog_of_Approved_Courses.aspx.

Courses marked with asterisks (primarily 300- and 400-level courses) were taught under the auspices of South Carolina State University, and course descriptions can be found on their web site.

Course #	Course Title	2009		2010		2011		2012		2013		2014		2015		2016	
		S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	S
EEM 117	AC/DC Circuits I								x	x	x		x		x		
EEM 145	Motor Controls I														x		
EEM 201	Electronic Devices I									x		x					
EEM 215	DC/AC Machines									x	x		x		x	x	
EET 111	DC Circuits I		x														
EET 112	DC Circuits II	x			x												
EET 113	Electrical Circuits I				x		x			x	x		x		x		
EET 114	Electrical Circuits II					x		x		x		x		x		x	
EET 130	Network Devices						x		x		x		x				x
EET 131	Active Devices		x		x												
EET 140	Digital Electronics						x		x	x	x	x	x	x	x	x	x
EET 141	Electronic Circuits					x		x	x								x
EET 145	Digital Circuits		x		x												
EET 210	Digital Integrated Circuits				x												
EET 220	Analog Integrated Circuits				x												
EET 227	Electrical Machinery						x										
EET 231	Industrial Electronics				x				x								
EET 235	Programmable Controllers		x														
EET 241	Electronic Communications		x												x		x
EET 251	Microprocessor Fundamentals										x						x
EET 253	Microprocessors		x														
EET 374	Electrical Machines *						x										
EET 443	PLC and Virtual Instruments Laboratory *		x														
EET 450	Introduction to Electrical Power Systems *				x		x										
EET 453	Machine and Power Laboratory *				x		x										

EET 459	Senior Design Project Proposal *			X							X									
EET 460	Senior Design Project *				X							X								
EET 475	Computer Aided Design of Electrical Systems *										X									
EET 480	Introduction to Robotics *												X							
EET 483	Control and Robotics Laboratory *												X							
EGR 105	Safety in Workplace				X															X
EGR 130	Engineering Technology Applications and Programming					X	X	X	X	X	X			X	X				X	X
EGR 255	Engineering Technology Senior Systems Project				X	X				X	X	X	X	X	X	X	X			X
ET 212	Statics *	X					X				X									
ET 255	Engineering Economics *													X						
IMT 101	Introduction to Industrial Maintenance																		X	
IMT 113	Power Tools Operation																	X	X	
IMT 131	Hydraulics and Pneumatics																		X	
P 253	General Physics Laboratory *													X						
P 255	General Physics II with Calculus *													X						

2. Attended Project Lead The Way core training, summer 2010 and summer 2011. As a result, I am now a fully qualified instructor for PLTW's Principles of Engineering (ATC's EGR 130) and Digital Electronics (ATC's EET 140) courses.
3. Attended Solar Technology training at NCSU, June 7-18, 2010. Achieved a 95.6% score (passing = 70%) on the NABCEP Entry Level Exam, June 18, 2010.
4. Drawing on my years of multidisciplinary experience in industry, upgraded and modernized ATC lab equipment where needed and developed original laboratory exercises for AC, DC, semiconductor devices, and integrated circuits courses using it.
5. Acting as Academic Coordinator, August 2010 to January 2013:
 - A. Revamped the EET curriculum placing program goals in better alignment with community needs as expressed by the Advisory Committee and others. Incorporated four PLTW courses into the curriculum and made other changes replacing outdated courses and where possible consolidating EET courses with equivalent ones in other programs.
 - B. Coordinated preparations for a PLTW site visit in September 2012, which resulted in ATC's certification as a full member of the nationwide PLTW program.
 - C. Chaired the EET Advisory Committee, made up of representatives from local industries and other likely employers of EET graduates.

While employed at Healthonics, Inc. (2000-2007) and MedRelief, Inc. (2007-2009):

1. Continued development and patenting of MedRelief[®] electronic healing stimulators*.
2. Evaluated and reverse-engineered competing products.
3. Authored white papers, technical and promotional materials on the MedRelief[®] technology. Developed brochures, information sheets, trade-show displays and Internet web site materials promoting the MedRelief[®] products. See "MedRelief-related publication and presentation titles."
4. Prepared three 510(k) FDA premarket clearance applications for prospective Healthonics MedRelief[®] products. Applications were given FDA file numbers K003507, K030998 and K060669. All three products were cleared by the FDA for legal sale.

5. Tested, randomized and prepared MedRelief® products and kits for research partners, evaluators, clinical trials, and potential sales partners.
6. Coordinated all technical aspects of third-party research using MedRelief® signals on cells and cell cultures to establish mechanisms of action. See Publications.

(* - Resulted in one or more U. S. Patents.)

While Employed at Equitech Int'l (1996-2000):

1. Developed a low-infiltration safety insert for laboratory fume hoods.*
2. Developed cost-effective power stabilization and surge-protection products.*
3. Developed compact multifrequency dipole arrays for TV and FM radio reception. Equitech, Intl. formed a daughter company, Tenna Ltd., in 2000 to help commercialize these devices.
4. Continued development of compact electronic bone, tissue and wound healing stimulators, based partly on my earlier research while at SRS but with improved circuitry and wider applications.* Equitech formed a daughter company, Healthonics, Inc., in 2000 to help commercialize and further develop these devices.
5. Developed brochures, information sheets, trade-show displays and Internet web site materials promoting the above products.

(* - Resulted in one or more U. S. Patents.)

While Employed at SRTC (1981-1995):

1. Conceived and developed novel sensors for radioactive and corrosive environments.*
2. Conceived and developed instruments, including a novel electrochemical reference electrode, for materials characterization and corrosion studies.*
3. Conceived and developed automated instruments for proof and optimization of “Saltstone” nuclear waste solidification technology.*
4. At the request of Wackenhut Security International (WSI), conceived and developed a “cheat-proof” electronic random selector for security search selection.* My selectors are still in use at SRS secure entry points as of July 2009.
5. Conceived, developed and successfully tested the “Bone Welder,” an improved compact bone healing stimulator based in part on earlier pulsed electromagnetic field (PEMF) technology.* This was the starting point for all later MedRelief® development.
6. At the request of the National Food Processors' Association, conceived and developed a novel technology for leak detection in food packaging, adapting a sulfur hexafluoride tracer gas and detection method used at SRS for radioactive release track prediction.*
7. At the request of the Ruth Patrick Science Education Center on USC-Aiken campus, developed nuclear science and other educational displays some of which are still in use.
8. Conceived, developed and helped patent many other inventions adapting SRS-related technologies, or skills and knowledge acquired in my SRS-related work, to private-sector applications.*
9. Ten times selected to receive the George Westinghouse Award, Westinghouse’s highest award for employee innovation and invention.
10. Four times selected to receive the SRS Total Quality Achievement Award.

11. Named a Westinghouse Fellow Engineer, November 17, 1994.

(* - Resulted in one or more U. S. Patents.)

Publication and presentation titles, co-authors (if any), dates, and significance.

1. Co-author, "Release of nitric oxide (NO) by pulsing electric field (PEF) in chondrocytes falls within growth enhancing parameters." RJ Fitzsimmons¹ and JW Kronberg². ¹The Technical Basis LLC, Loma Linda, CA, 92354. ²MedRelief, Inc. Atlanta, GA, 30071. Accepted January 2008 for presentation at the 2008 Bioelectromagnetic Society (BEMS) Annual Meeting, San Diego, CA.
2. Co-author, "A pulsing electric field (PEF) increases human chondrocyte proliferation through a transduction pathway involving nitric oxide signaling." RJ Fitzsimmons, The Technical Basis LLC, Loma Linda, CA; SL Gordon, Healthonics, Inc. Atlanta, GA; JW Kronberg, Healthonics, Inc. Atlanta, GA; TM Ganey, Department of Orthopedic Surgery, Atlanta Medical Center, Atlanta, GA; AA Pilla, Departments of Biomedical Engineering, Columbia University and Orthopedics, Mount Sinai School of Medicine, New York, NY. Submitted to Journal of Orthopedic Research (JOR); published online January 31, 2008 at <http://www3.interscience.wiley.com/cgi-bin/abstract/117905223/>; © 2008 Orthopaedic Research Society.
3. Co-author, "PEMF stimulates BMP production in a primary osteoblast culture: dependence upon signal configuration and exposure duration." TM Ganey¹, J Li², JW Kronberg³, JA Naftel³, SL Gordon³, WC Hutton² ¹Atlanta Medical Center, Atlanta, GA; ²Emory University, Decatur, GA; ³Healthonics, Aiken, SC. Presented at the 2006 Bioelectromagnetic Society (BEMS) Annual Meeting, Cancun, Mexico, June 9-15, 2006.
4. Co-author, "A capacitively coupled PEMF signal stimulates cartilage cells through a mechanism that may involve nitric oxide." RJ Fitzsimmons, The Technical Basis LLC, Loma Linda, CA, 92354; JW Kronberg, Healthonics, Inc. Aiken, SC 29803; JA Naftel, Healthonics, Inc. Aiken, SC 29803. Presented at the 2006 Bioelectromagnetic Society (BEMS) Annual Meeting, Cancun, Mexico, June 9-15, 2006.
5. Primary author, "A novel niobium 'salt' bridge for in-vitro PEMF studies." JW Kronberg, Healthonics, Inc. Aiken, SC 29803; TM Ganey, Atlanta Medical Center Department of Orthopaedics, Atlanta, GA 30312; RJ Fitzsimmons, The Technical Basis LLC, Loma Linda, CA 92354. Presented at the 2006 Bioelectromagnetic Society (BEMS) Annual Meeting, Cancun, Mexico, June 9-15, 2006.
6. Co-author, "Effect of PEMF signal configuration on mineralization and morphology in a primary osteoblast culture." TM Ganey^{1,2}, JW Kronberg⁴, ³EB Hunziker, JA Naftel³, SL Gordon⁴. ¹Atlanta Medical Center, Atlanta, GA; ²University of South Florida, Tampa, FL; ³ITI Research Institute for Dental and Skeletal Biology, Bern, Switzerland; ⁴Healthonics, Aiken, SC. Presented at the 2005 Bioelectromagnetic Society (BEMS) Annual Meeting, Dublin, Ireland, June 19-24, 2005.
7. Co-author, several protocols for proposed Healthonics, Inc. and MedRelief, Inc. clinical trials. Prepared technical sections, use instructions, and electrode placement guides.
8. Numerous presentations, white papers and preview sheets for products I helped develop while at Healthonics, Inc. and MedRelief, Inc., for distribution to potential research partners or investors. Primary author, with input from others in Healthonics, Inc. or MedRelief, Inc. and outside research partners.

9. "Healthonics, The Biophysics Health Company." Web site posted at www.healthonics.com in November 2001. Created all graphics and about 90% of the text content. Site was taken down upon Healthonics' merge into MedRelief, Inc. in January 2008, but some content was reused in the MedRelief web site (www.medrelief.net) posted through March 2009.
10. Numerous presentations, white papers and preview sheets for products I helped develop while at Equitech Int'l, including MedRelief® devices, for distribution to potential research partners or investors. Primary author, with input from others in Equitech.
11. "Testing for Jaundice Without Pain." Interview by Summer Brown for WAGT (Augusta, GA channel 26) "News at 11"; aired February 21, 1996.
12. "Wastewater Heat Recovery Apparatus". Interview by Audrey Fannin for "Pulse of the Planet," a National Public Radio show featuring new "Earth-friendly" technologies; aired May 9 and 10, 1995.
13. "Anatomy of an Inventor"; "Keys to Creativity"; "Steps to a Successful Patent." No co-authors. A three-part seminar covering the invention, patenting and commercialization processes, developed for use both on-site at SRS and in its Traveling Lecturer Program. Various live presentation dates, December 1994 - February 1996. In addition, an electronic version of the seminar was placed on the SRS intranet system.
14. "Sulfur Hexafluoride in Tracer Gas Analysis for Leak Detection." No co-authors. November 1, 1994. Invited presentation to the National Food Processors' Association, Packaging Technical Committee, in Los Angeles, CA; an upgraded version of the May 17, '94 Chicago presentation.
15. "Process For Removing and Detoxifying Cadmium from Scrap Metal Including Mixed Waste." No co-authors. July 19, 1994. Paper and poster session at 35th Annual Meeting, Institute of Nuclear Materials Management, Naples, Florida.
16. "Sulfur Hexafluoride in Tracer Gas Analysis for Leak Detection." No co-authors. May 17, 1994. Invited presentation for workshop on "Plastic Packaging Integrity Testing: Assuring Seal Quality", Chicago, Illinois; co-sponsored by Food Processors' Institute and Institute of Packaging Professionals.
17. "Random Selector" and "Bone Welder." Primary author, with input from SRS Technology Transfer Group. Posters and demonstrations featured in an SRS booth at the Sixth National Conference on Federal Quality, Washington, DC, July 20-23, 1993.
18. "'Smart Watchdog' Safety Switch." No co-authors. June 5-6, 1993. Posters and demonstration at National Inventors' EXPO, Washington, DC (sponsored by U.S. Department of Commerce).
19. "A Sampling of Available SRS Dual-Use Technologies." Various dates, June 1992 to December 1995. Co-presented with SRS Technology Transfer Group and other SRS inventors. Posters, demonstrations and slide presentations on patented inventions, given to potential outside investors, patent licensees and the general public. Content differed with time; title was a "catch-all" for inventions currently being featured. First public presentation of the "Bone Welder" (so named by the SRS Technology Transfer Group) which, with further development, would become the basis for the MedRelief® technology.
20. "The Colors of Gold." No co-author. September 20, 1991. Invited lecture to the Augusta Gem and Mineral Society; based on my Rock & Gem article of the same title (see next item).
21. "The Colors of Gold"; in Rock & Gem Magazine (Miller Magazines, Ventura, California), vol. 21, #9 (September, 1991), pp. 78-82. No co-authors. Compilation of published formulas for colored gold alloys, and techniques for preparing them from scrap gold.

22. "An Electronic Random Selector for Security Applications." Poster session and slide presentation at 32nd Annual Meeting, Institute of Nuclear Materials Management, New Orleans, Louisiana, July 29, 1991. No co-authors. Account of a development project done at SRTC in support of Wackenhut Security International, resulting in U.S. Patent #5,204,671.
23. "Self-Adjusting Silver Solder"; in *Rock & Gem Magazine* (Miller Magazines, Ventura, California), vol. 19, #4 (April, 1989), pp. 98-101. No co-authors. Theoretical discussion and practical guide to making and using a solder I developed in the 1970's to simplify the assembly of silver jewelry. (No patent was sought; this was an attempt to reconstruct prior art I'd read many years before.)
24. "Nuclear Science"; "Basic Nuclear Science"; "Nuclear Reactor Technology." No co-authors; various co-presenters; various dates, 1986 to 1993. A traveling "road show" of posters, specimens and interactive demonstrations I developed for both on- and off-site education. Presented roughly 20 times at USC-Aiken SEED, SRS Appreciation Days, schools, Scouting and other outside agencies/activities on request. When not traveling, the exhibits resided at SRTC and were used in site tours.
25. "Build a \$100 Fringe-Area Antenna for Under \$20!"; in *Mother Earth News* #93 (May- June 1985), pp.116-119. No co-authors. Step-by-step guide to duplicating a high-gain TV and FM antenna I designed for friends while at Clemson in 1980.
26. "General-Purpose Chemical Analyzer for On-Line Analysis of Radioactive Solutions." Presented at 26th Annual Conference on Analytical Chemistry (the "Gatlinburg Conference"), Knoxville, Tennessee. William A. Spencer, co-author. October 12, 1983. Described early development aimed at creating an instrument comparable to E. I. DuPont's Automated Clinical Analyzer but designed for the nuclear industry.
27. "High-Temperature Characteristics and Thermal Degradation Mechanisms of Silicon-on-Sapphire (SOS) MOS Transistors and CMOS Logic." No co-authors. May 1, 1981. Master's Thesis, based chiefly on work described in the following five items.
28. "High-Temperature Behavior of MOS Devices." J.W. Kronberg (no co-authors). Presentation at IEEE Southeastern Conference ("Southeastcon"), Huntsville, Alabama, on April 7, 1981. An account of my part of an ongoing DOE-sponsored research program.
29. "Performance of Digital Integrated Circuits at Very High Temperatures." J.L. Prince, B.L. Draper, E.A. Rapp, J.W. Kronberg*, and L.T. Fitch, IEEE Transactions on Components, Hybrids and Manufacturing Technology, Vol. CHMT-3, No. 4, pp. 571-579, 1980. (* - misprinted in journal as "J.N. Kronberg.")
30. "An Overview of Digital Integrated Circuit Technologies for 300°C Applications." J.L. Prince, J.W. Kronberg, E.A. Rapp and L.T. Fitch. Presentation at IEEE Southeastern Conference ("Southeastcon"), Nashville, Tennessee in April, 1980. Dr. Prince presented.
31. "High Temperature Performance of Commercial Integrated Circuits." J.L. Prince, E.A. Rapp, J.W. Kronberg and L.T. Fitch, High Temperature Electronics and Instrumentation Seminar Proceedings, Sandia National Laboratory Document SAND80-0834C, pp. 115-122. Seminar was held December 3-4, 1979 in Houston, TX. Dr. Fitch presented.
32. "High Temperature Electronics – A New Solution to Old Instrumentation Problems." J.L. Prince, E.A. Rapp, J.W. Kronberg and L.T. Fitch. Presentation at IEEE Fall Technical Conference, Greenville, SC, in November 1979. Dr. Prince presented.

33. "Tech Talk: Increased Emphasis Placed on Soviet Jamming"; in Air Force Communications Service news magazine Intercom, February 18, 1977. No co-authors. Explained radio jamming types and characteristics, and described an electronic simulator for the main Soviet jamming modes which I developed to aid in combat flight crew training.
34. "A User-Level Guide to TEMPEST (Compromising Emanations)". No co-authors. November, 1976. An unclassified training booklet on a much-misunderstood electronic security subject; specific to Kincheloe AFB where I was Base TEMPEST Officer, but later used as a model by four other Strategic Air Command bases in preparing their own.
35. "Don't Step On My Video." Kincheloe AFB Chieftain, September 24, 1976. Described the growing problem of Citizen's Band interference with TV and FM radio, and how to build inexpensive electronic filters to prevent it.

Issued United States Patents, To Date. (Additional patents are pending.)

Each entry below shows the U.S. patent number, issue date, title, co-inventors (if any), and assignee. Unless co-inventors are shown for a given patent, I was the sole inventor. Where an asterisk ("*") is shown after the issue date, it shows the patent was also filed internationally and other issue dates and patent numbers may apply elsewhere.

PDF copies of all patents listed below, as published by the U.S.P.T.O., can be found at www.freepatentsonline.com/xxxxxxx.pdf, where "xxxxxxx" in each case is replaced by the actual seven-digit patent number excluding the commas.

<u>Patent #</u>	<u>Issued</u>	<u>Title and (co-inventors, if any)</u>	<u>Assignee</u>
10,544,388	01/28/20*	Methods for modulating osteochondral development using bioelectrical stimulation (with TM Ganey and SL Gordon)	MedRelief, Inc.
10,317,074	06/11/19	Hand-held medication and electronic waste incinerator (with BP Hamilton and LA Hamilton)	Mini Incinerator, LLC
9,981,411	05/29/18*	Structural composition and method (with GE Green)	Marhaygue, LLC
9,845,452	12/19/17*	Methods for modulating osteochondral development using bioelectrical stimulation (with TM Ganey and SL Gordon)	MedRelief, Inc.
9,630,001	04/25/17*	Methods for modulating osteochondral development using bioelectrical stimulation (with TM Ganey and SL Gordon)	MedRelief, Inc.
8,960,440	02/24/15*	Blister pack content usage monitoring	VeriMed Holdings, LLC
8,785,196	07/22/14*	Methods for modulating osteochondral development using bioelectrical stimulation (with TM Ganey and SL Gordon)	MedRelief, Inc.
RE43,374	05/08/12*	Apparatus and method for bioelectric stimulation, healing acceleration and pain relief	MedRelief, Inc. (reissue of 6,535,767)

8,159,312	04/17/12*	Method and system for signal coupling and direct current blocking	MedRelief, Inc.
7,840,272	11/23/10*	Methods for modulating osteochondral development using bioelectrical stimulation (with TM Ganey and SL Gordon)	Healthonics, Inc.
7,117,034	10/03/06*	Apparatus and method for bioelectric stimulation, healing acceleration, pain relief, or pathogen devitalization	Healthonics, Inc.
6,535,767	03/18/03*	Apparatus and method for bioelectric stimulation, healing acceleration and pain relief	Healthonics, Inc.
6,417,651	07/09/02	Digitally-controlled AC voltage stabilizer	Equitech Int'l.
6,321,119	11/20/01	Pulsed signal generator for bioelectric stimulation and healing acceleration	Equitech Int'l.
6,121,716	09/19/00	Apparatus and method for prevention of cracking in welded brittle alloys (with RM Younkings)	U. S. Dept. of Energy
6,011,994	01/04/00	Multipurpose biomedical pulsed signal generator	Equitech Int'l.
5,860,711	01/19/99	Isolation enclosure (with KW Haerer)	Equitech Int'l.
5,772,328	06/30/98	Optical temperature sensor using thermochromic semiconductors	U. S. Dept. of Energy
5,722,290	03/03/98	Closed-field capacitive liquid level sensor	U. S. Dept. of Energy
5,547,283	08/20/96	Optical temperature sensor using thermochromic semiconductors	U. S. Dept. of Energy
5,499,597	03/19/96	Optical temperature indicator using thermochromic semiconductors	U. S. Dept. of Energy
5,499,529	03/19/96	Detecting small holes in packages (with JR Cadieux)	U. S. Dept. of Energy
5,463,377	10/31/95	Apparatus for detecting the presence of a liquid	U. S. Dept. of Energy
5,431,148	07/11/95	Immersible solar heater for fluids	U. S. Dept. of Energy
5,424,731	06/13/95	Remote two-wire data entry method and device	U. S. Dept. of Energy
5,413,596	05/09/95	Digital electronic bone growth stimulator	U. S. Dept. of Energy
5,405,588	04/11/95	Process for removing cadmium from scrap metal	U. S. Dept. of Energy
5,405,231	04/11/95	Conveyor with rotary airlock apparatus	U. S. Dept. of Energy
5,388,446	02/14/95	Method and apparatus for container leakage testing	U. S. Dept. of Energy
5,334,847	08/02/94	Composition for radiation shielding	U. S. Dept. of Energy
5,317,253	05/31/94	Concealed wire tracing apparatus	U. S. Dept. of Energy

5,316,649	05/31/94	High frequency reference electrode	U. S. Dept. of Energy
5,315,884	05/31/94	Capacitive proximity sensor	U. S. Dept. of Energy
5,314,735	05/24/94	Surface coating for prevention of crust formation	U. S. Dept. of Energy
5,296,715	03/22/94	Optically isolated signal coupler with linear response	U. S. Dept. of Energy
5,259,382	11/09/93	Optical transcutaneous bilirubin detector	U. S. Dept. of Energy
5,251,490	10/12/93	Ultrasonic fluid flow measurement method and apparatus	U. S. Dept. of Energy
5,245,619	09/14/93	Generation of low-divergence laser beams	U. S. Dept. of Energy
5,217,009	06/08/93	Compact biomedical pulsed signal generator for bone tissue stimulation	U. S. Dept. of Energy
5,204,671	04/20/93	Random one-of-N selector	U. S. Dept. of Energy
5,198,870	03/30/93	Atomic line emission analyzer for hydrogen isotopes	U. S. Dept. of Energy
5,189,359	02/23/93	Solid state safety jumper cables	U. S. Dept. of Energy
5,159,318	10/27/92	Universal single point liquid level sensor	U. S. Dept. of Energy
5,157,465	10/20/92	Universal fiber-optic C.I.E. colorimeter	U. S. Dept. of Energy
5,157,426	10/20/92	False color viewing device	U. S. Dept. of Energy
5,147,471	09/15/92	Solder for oxide layer-building metals and alloys	U. S. Dept. of Energy
5,143,149	09/01/92	Wastewater heat recovery apparatus	U. S. Dept. of Energy
5,119,014	06/02/92	Sequential power-up circuit	U. S. Dept. of Energy
5,054,023	10/01/91	"Smart" watchdog safety switch	U. S. Dept. of Energy
5,046,371	09/10/91	In-line rotating capacitive torque sensor	U. S. Dept. of Energy
5,039,978	08/13/91	Analog graphic display method and apparatus	U. S. Dept. of Energy
5,030,011	07/09/91	Mixing blade system for high-resistance media	U. S. Dept. of Energy
4,979,397	12/25/90	In-line rotating torque sensor with on-board amplifier	U. S. Dept. of Energy
4,952,892	08/28/90	Wave guide impedance matching method and apparatus	U. S. Dept. of Energy
4,945,953	08/07/90	Surface mount component jig	U. S. Dept. of Energy