

## Biography – Jerry T. Ball

Jerry Ball was born in Lake Charles, Louisiana. He was the third born son and eventually became one of six boys in the Ball family. His father was a flight engineer in the Air Force for KC-97 air refuelers. His father was born and raised in Kentucky, and was one of seventeen children. His mother was born in Taylor, Arizona of Mormon pioneer stock. She had a single sister, although her mother had a large number of brothers and sisters. Jerry's parents met when his father was stationed at Williams Air Force Base in Mesa, Arizona.

The Ball family retired to Mesa, Arizona, where Jerry attended Junior High and High School. Jerry was awarded a Four-Year Army ROTC Scholarship and attended Arizona State University where he completed a Bachelors Degree in Chemistry, with a near minor in French. After completing his degree, Jerry was commissioned a Second Lieutenant in the Army and completed four years of active duty, being station in Heidelberg, Germany, SHAPE (Supreme Headquarters Allied Powers Europe), Belgium and Charlotte, North Carolina. Lt. Ball worked as a Post Office Commander at SHAPE and an admin officer in his other assignments. Following his active duty service, Jerry moved to Tampa, Florida and worked as a Project Administrator for a company that built aircraft simulators, while pursuing a degree in Business Finance at the University of South Florida. After two years in Tampa, Jerry decided to return to school full time to pursue a Masters Degree in Computer and Information Science at the University of Florida. His first semester at the University of Florida, Jerry took a course in COBOL programming. At the time, COBOL programming was a required course for business majors and there was a shortage of teachers to handle the large number of students. For the next five semesters, Jerry taught COBOL programming while pursuing the Masters Degree. The first semester teaching, his students used punch cards to create their programs. During the summers, Jerry returned to active duty in the Army, working three summers at Camp Beauregard, Louisiana and one summer at Camp Gruber, Oklahoma—attaining the rank of Captain in the process. At the University of Florida, Jerry became interested in Artificial Intelligence and Natural Language Processing, especially Machine Translation. He completed his Masters Degree under Doug Dankle II. His Masters Thesis concerned the use of Expert Systems techniques in the development of Natural Language Processing systems.

Jerry decided to continue his education and began a PhD in Computer Science at New Mexico State University. Jerry was awarded a Research Fellowship in the Computing Research Laboratory (CRL) and participated in the Natural Language Processing group of the CRL under the direction of Yorick Wilks. At the time, the Computer Science Department at NMSU did not recognize AI as a core topic, and Jerry's research fell outside the required study areas. Facing the prospect of taking an Operating Systems course for the third time, Jerry was swayed by the suggestion of Professor Ken Paap, from whom he had taken a course in Psycholinguistics, that he consider pursuing his PhD in the Psychology Department. The Psychology Department had an interest in Cognitive Science and allowed students to structure their own research program, selecting the topics which would be tested on the comprehensive exam and which would contribute to their

research, rather than insisting that all students take the same courses and comprehensive exam, as was the case in the Computer Science Department. Jerry decided to make the switch to Psychology and Ken Paap became his advisor. Although Jerry was able to structure his own research program, there were significant statistics coursework requirements in the Psychology Department that Jerry had to meet and this extended the time to complete his coursework. Jerry continued his research in Natural Language Processing, adopting a Cognitive Science viewpoint that focused on psychological plausibility, but maintaining an interest in the development of large-scale language understanding systems. As part of his research, he implemented a sizeable language processing system in Prolog. That system was used in the development of a prototype German analysis system for use in a five language Machine Translation (MT) system and in the development of the English analysis component of a two language English-Japanese MT system. The implementation of these systems informed his theoretical research in many ways. The underlying theory was called PM, Propositional Model, and the focus was on the direct interpretation of English text into propositional representations of meaning, albeit representations that contained actual and ambiguous linguistic tokens instead of abstract unambiguous concepts or word senses. Jerry completed his doctoral research in 1991.

After completing his PhD, Dr. Ball accepted a position at a company in Albuquerque, New Mexico, called Orion International Technologies, that had been awarded two separate AI contracts—although the company was primarily a nuclear physics company. Jerry worked on the contracts for two years and when the contracts ended, he decided to seek employment elsewhere rather than trying to fit in to the physics work that was the focus of the company. Jerry acquired a position as a Prolog programmer for a startup company, called ReGenesis, that was developing software to help COBOL programmers deal with the massive amounts of legacy code that was extremely difficult to maintain and increasingly out of date with internet technologies. Jerry's background in COBOL and Prolog made him a good candidate for this position, although the software being developed had little relevance to his research interests. After three years at ReGenesis, Jerry took a position at a second startup company that was a commercial spin-off from Mitre, called Concept Five. In addition to hiring Jerry, Concept Five purchased the rights to use the software, called Analyzer Internet, that Jerry had been working on at ReGenesis. At C5, this software was used as a component in a software toolkit, the Legacy Access Development Toolkit (LADT), developed to support the integration of legacy COBOL software with modern internet and object-oriented (including CORBA) software. Jerry worked at Concept Five for three years, and saw the transition of the company from a software development and professional services company, to a pure professional services company. When the software development work at C5 stopped, Jerry worked on several professional services contracts, including supporting BEA Systems in integrating its C based Tuxedo and Java based WebLogic products with legacy software, redesigning the legacy software at General Motors, and implementing new internet Java/WebLogic software at Wells Fargo. Jerry left Concept Five to go to work for an internet startup company, called Axient, that was developing a high-speed nationwide network to push internet content. The key idea at Axient was to position powerful caching servers with large storage capacity around the nation so that an initial

internet request would be cached locally to speed up subsequent requests and to avoid overloading the bandwidth of the network. With this system, Axient claimed to be capable of delivering full-screen, digital quality movies in real-time over the internet without breakup in the signal. Unfortunately, Axient entered the internet arena at the time that the internet bubble was bursting. Funds to maintain the business dried up before enough content providers could be enticed to provide enough content to attract enough content users to make the network successful. Axient was forced into bankruptcy. The software Jerry was developing in Java servlets using the WebSphere application server to provide content over the network never entered service. At the end of this phase of Jerry's career, he had worked for three separate startup companies, acquired knowledge of and experience with many of the internet technologies being developed (e.g. Java, Javascript, HTML, XML, web application servers, CORBA, Java servlets, ASP), and failed to get rich three times.

During his ten years working for commercial companies, Jerry maintained an interest in returning to a research position. The opportunity finally came when he was hired to work at the Air Force Research Laboratory in Mesa, Arizona. The lab was located at the old Williams Air Force Base, where his father was stationed when he met Jerry's mom, and which had closed in the early 90's. Initially working for L3 Communications, the lead contractor providing support to the lab, and subsequently working as a government civilian, Jerry was hired as the software lead for the development of a computational cognitive model of an Unmanned Aerial Vehicle (UAV) pilot, capable of flying a UAV simulator. The computational cognitive model was implemented using the Atomic Components of Thought – Rational cognitive architecture and modeling environment developed by John Anderson and colleagues and made available free to the research community. That research led to publication of a paper co-authored by Jerry, which was presented by Kevin Gluck at the International Cognitive Modeling Conference in 2003 and awarded the Siegel-Wolf award for best applied paper. Jerry also began pursuing research in language comprehension leading to the development of Double R Theory, an extension of his earlier PM research, which is focused on the encoding of referential and relational meaning—adding the referential dimension of meaning to his earlier research in propositional representation.