

**CHARLES M. DILLINGHAM, JR.**

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## **Education**

- M.S. in Applied Physics, emphasis in computational physics, University of New Orleans, December 1995. Thesis: *Identification of Cosmic-Ray Trajectories in an Emulsion Chamber: Individual Exposed Grains.*
- B.S. in Physics, B.S. in Mathematics, University of Southern Mississippi, December 1979.

## **Honors and Memberships**

- Recipient of the 1995 Bill Good award for outstanding physics research, University of New Orleans.
- Member of Sigma Pi Sigma, physics national honor society.
- Finalist in the Business Launch Competition sponsored by the Technology Association of Georgia and the Georgia Research Alliance. Entry was "Forecasting Grid Solutions: A business plan to develop and market an integrated financial modeling system which utilizes established grid-computing technology to perform mathematical-finance computations *very* quickly."

## **Languages and Software**

- C, Visual C++, Unix shell script (sh, csh), awk, Fortran, COBOL, X-Window/Motif, assembler.
- RDBMS: MySQL, Sybase SQL, dBASE.
- Web: HTML, XHTML, DHTML, CSS, PHP, CGI, MySQL, JavaScript, Photoshop, stateless programming.

## **Operating Systems**

Windows, Unix (Linux, SunOS, Solaris, OSF/1, AIX, IRIX, UNICOS), VAX VMS, Stratus VOS, DG AOS/VS.

## **Architectures**

RISC (DEC, Sun, IBM), CISC (Intel x86), Massively parallel (Cray T3E, Origin 2000, IBM SP2), DEC VAX, Data General MV4000, Stratus, Interdata, Univac.

## **Employment History**

### **Dec. 05 - Jul. 07 Jones Research and Consulting Inc.**

Web-site development: HTML, XHTML, DHTML, CSS, PHP, CGI, MySQL, JavaScript, Photoshop.

### **March 04 - present DeKalb Tutoring & Engineering Services, New Orleans, Newnan, GA, Clarkston, GA**

Self-employed, I tutor physics, mathematics, chemistry, computer science, standardized-test preparation, English grammar and composition, music theory and composition, and provide recording-studio engineering services.

### **July 08 - May 09 Tutor.com, New York, NY**

Tutor students online: Algebra, calculus, physics, biology, English composition and grammar.

### **Sep. 02 - Dec. 03 Delgado Community College, Department of Physics, New Orleans, LA**

Full-time instructor of physics and physical science. Presented lectures, prepared and graded all tests and assignments, set up laboratories, maintained and ordered equipment and supplies.

### **Jan. 02 - May 02 Hinds Community College, Department of Physics, Raymond, MS**

Adjunct instructor of physics and physical science. Same responsibilities as described for Delgado College above.

### **Jan. 99 - Aug. 01 ERDC MSRC, DOD Supercomputing Facility, Vicksburg, MS**

Developed software systems and provided technical analysis and support for a major supercomputing facility.

- Developed and implemented a contiguous-node, dynamic-backfill algorithm for scheduling batch jobs on two massively parallel supercomputers, the SGI Origin2000 and the Cray T3E.
- Designed and ran simulations which showed that my algorithm balances the requirements of physical-node contiguity, job priorities, and estimated run times more efficiently than do other schedulers currently in use in the supercomputing industry.
- Wrote Unix shell scripts and C code to collect and process metric data, and to present the data in two- and three-dimensional graphs.

**Jun. 98 - Nov. 98      New Horizons Computer Learning Center, Philadelphia, PA**

Instructed night classes and computer labs in C programming and Unix C shell.

**Mar. 97 - Mar. 98      Trafigura Ltd., London, U.K. and New York, New York**

Worked as a consultant doing derivatives research for an international physical-futures trading firm.

- Developed mathematical models to compute theoretical values of derivatives on physical futures. Unlike over-the-counter “exotic” options, these were unique, trader-derived option contracts which must be priced using algorithms and computational software which cannot be bought off-the-shelf, but must be developed case-by-case. Numerical simulations are required because the theoretical values depend upon not only the price, but the historical price *path* of the underlying instrument, and cannot be computed in closed form.
- Designed and implemented Monte Carlo simulations to generate theoretical option prices from the mathematical models I developed.
- Created a system in Visual C++ that provides futures traders with technical analysis, data management, etc.

**May 96 - Mar. 97      Philadelphia Stock Exchange, Philadelphia, PA**

Designed, coded, tested, and provided production support for the real-time software systems involved in trading equity options on the Philadelphia Exchange.

- Wrote C code and Unix shell scripts; wrote real-time networking software using Network Express.
- Developed test scripts; conducted system tests after-hours in a real-time, simulated trading environment.
- Wrote user manuals and preliminary and detailed design documents; participated in code reviews.

**Sep. 95 - Dec. 95      University of New Orleans, Department of Physics, New Orleans, LA**

Finished research and thesis for my master’s in Applied Physics with emphasis in computational physics. Developed and implemented a highly effective two-dimensional image-analysis algorithm which identifies individual exposed grains (exposed by cosmic rays) in stacked nuclear emulsion layers. The resulting 2-D coordinates were used as input to another algorithm developed by my thesis advisor which utilizes neural networks to link the 2-D coordinates from multiple emulsion plates into 3-D particle trajectories. My thesis can be seen, including all images, at [http://dekalbtutoring.com/thesis/thes\\_cont.htm](http://dekalbtutoring.com/thesis/thes_cont.htm).

**Feb. 92 – Sep. 95      LA State University Medical Center, Dept. of Biometry and Genetics, New Orleans**

Provided analysis, software development, and technical support for statistical and genetic-linkage research.

- Developed C and Fortran software and Unix shell scripts to assist doctoral students in computational genetics and algorithm implementation.
- Wrote mathematical documentation and code enhancements for S.A.G.E. (Statistical Analysis for Genetic Epidemiology), an ANSI-standard software system written in Fortran, developed by LSU Medical Center, and now funded by NIH and NCRR (<http://darwin.cwru.edu/sage/>).
- Developed web applications with HTML and CGI.
- Installed and administered HTTP servers and Unix and VMS systems on a TCP/IP network.
- Built and maintained relational data bases (Sybase SQL and dBASE).
- Developed GUI software with X-Window/Motif.

**Sep. 89 - Dec. 91      University of New Orleans, Department of Physics, New Orleans, LA**

Worked as a teaching assistant while taking coursework for my M.S. in Applied Physics. Instructed physics laboratories, graded lab reports, prepared and graded all tests, kept office hours.

**Jun. 86 - Aug. 89      Smith Barney, Inc., New York, New York.**

Designed and wrote (in Fortran) all software used by the equity-options trading desk, including:

- A real-time trading-support system providing market-data analysis, strategy recommendations, and Black-Scholes theoretical pricing for put and call options.
- A program-trading and index-arbitrage system which allowed “basket trades” to be executed within seconds.
- A pair-trading system based on historical-price analysis and trade simulations to find correlations and anticorrelations between security prices.
- Created a twenty-four-hour production environment: Automatic initiation of system backups, data transmissions, end-of-day batch runs, and real-time monitoring and analysis programs.

**Jun. 84 - Jun. 86      Electronics Information Technology, Inc., Fairfield, NJ**

Wrote Fortran, COBOL, and assembly-language code for automated catalog production. Designed databases, wrote documentation, installed hardware and software, provided user technical support.

**Dec. 81 - May 84      Monchick-Weber Corporation, New York, New York**

Programmer-analyst for a software services and consulting firm.

- Developed software in Fortran and assembly language which provided real-time market data and analysis to stock, option, and futures traders.
- Helped design a network giving real-time access to multiple services and databases.
- System manager for four Data General MV/4000 computers.

**Dec. 79 - Aug. 81      Singer Aerospace & Marine Systems, Johnson Space Center, Houston, TX**

Programmer for the Space Shuttle Simulation Facility, where shuttle astronauts are trained. Designed, wrote, and tested the real-time Fortran software that simulates all visual aspects of a shuttle mission.

- Utilized Interdata minicomputers, Univac mainframes, and specialized hardware processors interconnected through shared memory and synchronous and asynchronous communication links.
- Employed real-time, 3-D, interactive computer graphics with occlusion, shadowing, and perspective.

**Jun. 78 - Dec. 79      NASA Earth Resources Laboratory, Stennis Space Center, Bay Saint Louis, MS**

Assistant physicist for projects in optical oceanography and remote sensing (a cooperative-education position).

- Developed a mathematical model that predicts the distribution and intensity of water-reflected sunlight and skylight in a satellite image, depending upon sun position, and implemented the model in Fortran.
- Used spherical trigonometry to devise a method for reflecting a beam of sunlight to an overpassing Landsat satellite to aid in superposing the image on a USGS map. Designed and assisted in the construction of a wood-and-metal, three-axis mirror system to accomplish this.
- Wrote NASA technical papers and manuals documenting the above projects.