

# Curriculum Vitae

Ray Franco, PhD., PE

Electrical Engineer

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## 1. Current Positions:

- Self Employed Forensic Electrical Engineer and Consultant and Fire Origin and Cause Investigator.
- University of Southern Mississippi Electronics and Computer Engineering Technology Industrial Advisory Committee Member.

## 2. Past Positions:

- Retired from the U.S. Army Engineering Research and Development Center in October 2003 with over 30 years of service.
- Adjunct Professor in Electrical Engineering at Mississippi State University – Also taught lecture courses at the Auburn University, Jackson State University, and the WES Graduate Institute.
- Chairman of the Mississippi Section of the Institute of Electrical and Electronics Engineers (2002-2003).
- Board of Directors, Mississippi Chapter of International Fire and Arson Investigators (Mississippi Fire Investigators Association) 2007.

### 3. Education:

#### a. Universities and Degrees.

|                 |                             |     |                   |
|-----------------|-----------------------------|-----|-------------------|
| Aug 82 - Dec 86 | Elec. Engr. (Computer Sci.) | PhD | Miss State Univ.  |
| Aug 81 - Jun 82 | Electrical Engr.            |     | Auburn Univ.      |
| Jun 80 - May 81 | Electrical Engr.            |     | Miss State Univ.  |
| Aug 77 - Aug 79 | Elec. Engr. (Math)          | MS  | Miss State Univ.  |
| Jul 69 - Dec 72 | Electrical Engr.            | BS  | Miss State Univ.  |
| Sep 68 - Jul 69 | Engineering                 |     | Hinds Jr. College |

#### b. Short Courses and Other Training

|                 |           |  |
|-----------------|-----------|--|
| Feb 06          | (2 hrs)   | Grounding in the Primary Zone (Entergy)          |
| Dec 05          | (5 hrs)   | Building Codes (MCIC)                            |
| Nov 05          | (2 hrs)   | Engineering Ethics (IEEE)                        |
| Nov 05          | (2 hrs)   | Low Voltage Controls for Power Systems (Entergy) |
| Sep 04          | (1.5 hrs) | Electric Power Surge Protection (Entergy)        |
| Aug 04          | (2 hrs)   | Electric Power Quality (Entergy)                 |
| Jun 04          | (1 hr)    | Power Management Control Systems (MES)           |
| Jun 04          | (1 hr)    | Electric Motor Failures (MES)                    |
| Jun 04          | (1 hr)    | Everyday Engineering Ethics (MES)                |
| Jun 04          | (1 hr)    | Security Technology Trends (MES)                 |
| Nov 03          | (2 hrs)   | Engineering Ethics (IEEE)                        |
| Aug 02          | (2 hrs)   | Engineering Ethics (IEEE)                        |
| Jun 01          | (3 days)  | Microsoft Access Database Programming (OPM)      |
| Oct 99          | (3 days)  | Java Programming (OPM)                           |
| Aug 97          | (5 days)  | Leadership Education and Development (OPM)       |
| Aug 94 - Dec 94 |           | Real Time Systems Computing (MSU)                |
| Dec 92          | (3 days)  | Microsoft Windows (OPM)                          |
| Nov 91          | (5 days)  | Intermediate C programming (OPM)                 |
| Oct 90          | (3 days)  | Data Acquisition Systems Design (ISA)            |
| Oct 90          | (2 days)  | Measurement Uncertainty (ISA)                    |
| Aug 90          | (5 days)  | C Programming (OPM)                              |
| Jan 89 - May 89 |           | Fiber Optics System (MSU)                        |
| Feb 88          | (2 days)  | Engineering Management (OPM)                     |
| Aug 87 - Dec 87 |           | Advance Signal Processing (MSU)                  |
| Jan 87 - Jun 87 |           | Digital Signal Processing (MSU)                  |
| Aug 87          | (5 days)  | Enable Software (OPM)                            |
| Feb 87          | (4 days)  | C programming (Masscomp)                         |
| Mar 86          | (4 days)  | Queuing Theory (Learning Tree)                   |
| Jun 81          | (4 days)  | Intel 8086 Microprocessor (Intel)                |
| Jul 76          | (5 days)  | Microprocessors (LSU)                            |
| Jun 76          | (5 days)  | Digital Logic (LSU)                              |
| May 74          | (10 days) | Economic Analysis (US Army)                      |

**c. National Electrical Code (NFPA)**

|        |          |   |
|--------|----------|---|
| Feb 09 | (4 hrs)  | NEC Grounding (Red Vector)                |
| May 06 | (21 hrs) | National Electrical Code (NFPA)           |
| May 06 | (7 hrs)  | NEC Hazardous/Classified Locations (NFPA) |
| May 06 | (7 hrs)  | Electrical Safety in the Workplace (NFPA) |

**d. National Electrical Safety Code Training:**

|        |          |  |
|--------|----------|--|
| Jun 09 | (32 hrs) | Staking Phase II – NESC Rules (Hi-Line)  |
| Apr 06 | (2 hrs)  | NESC Rules for the Installation and Maintenance of Electric Supply Stations and Equipment              |
| Dec 05 | (2 hrs)  | Overhead Lines (Sections 26 & 27)  |
| Aug 05 | (2 hrs)  | NESC Grades of Construction  |
| May 04 | (4 hrs)  | NESC Rules for the Installation and Maintenance of Underground Electric Supply and Communication Lines |

**d. Fire and Arson Training:**

|        |          |  |
|--------|----------|--|
| Dec 09 | (8 hrs)  | Residential Fires (Texas Engr. Ext. Service)   |
| Apr 08 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |
| Mar 08 | (8 hrs)  | LA-IAAI Commercial Kitchen Fires               |
| Aug 07 | (20 hrs) | IAAI-TN Chapter Expert Witness Course (tested) |
| Apr 07 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |
| Dec 06 | (16 hrs) | Central Texas Fire Investigators               |
| Oct 06 | Taught   | MFIA, Fire and Arson Seminar                   |
| Mar 06 | (20 hrs) | IAAI, Vehicle Fires Seminar (tested)           |
| Mar 05 | (20 hrs) | MFIA, Fire and Arson Seminar                   |
| Nov 04 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |
| Aug 04 | (20 hrs) | NAFI, Fire, Arson and Explosions (tested)      |
| Nov 03 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |
| Jun 03 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |
| May 02 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |
| Nov 01 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |
| Apr 01 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |
| Nov 00 | Taught   | MFIA, Fire and Arson Seminar (tested)          |
| Apr 00 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |
| Mar 99 | (20 hrs) | IAAI, Electrical Appliance Fires (tested)      |
| Oct 98 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |
| Apr 98 | (20 hrs) | MFIA Fire and Arson Seminar (tested)           |
| Nov 96 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |
| Oct 95 | (20 hrs) | MFIA, Fire and Arson Seminar (tested)          |

MFIA – Mississippi Fire Investigators Association  
IAAI – International Association of Arson Investigators  
NAFI – National Association of Fire Investigators

#### **4. Professional Registration:**

- Mississippi Professional Engineering License No. 7155, 1978.
- Louisiana Professional Engineering License No. 31177, 2004.
- Arkansas Professional Engineering License No. 12673, 2006.
- Alabama Professional Engineering License No. 28163-E, 2006.
- Florida Professional Engineering License No. 65763, 2007.
- Georgia Professional Engineering License No. PE032993, 2008.
- Missouri Professional Engineering License No. 2007032424, 2007
- Certified Professional Engineer by The National Council of Examiners for Engineering and Surveying, Certificate No. 23905, 2003.
- Certified Fire and Explosion Investigator (CFEI) by the National Association of Fire Investigators: Registration No. 10031-4612, 2004.

#### **5. Professional and Technical Societies:**

- National Society for Professional Engineers (NSPE) – #104049555.
- Mississippi Engineering Society (MES)
- Institute for Electrical and Electronics Engineers (IEEE) -#06504724.
- Society for American Military Engineers (SAME) - #744863.
- National Fire Protection Association (National Electrical Code) - #930898.
- National Association of Fire Investigators (NAFI) - #10031-4612.
- International Association for Arson Investigators (IAAI) - #19510
- Mississippi Fire Investigators Association (NFIA) - # 61
- Central Texas Fire Investigators Association #74-2952527

## **6. Participation in committees, panels, meetings or conferences:**

- University of Southern Mississippi Electronics and Computer Engineering Technology Industrial Advisory Committee – March 2005
- IEEE Southeastcon 2003, Section Chairman.
- IEEE Section Congress 2002, Section Chairman.
- Chairman Earthquake Session Shock and Vibration Symposium 1998.
- Co-Chairman of Dynamic Measurement Session Shock and Vibration Symposium 1997.
- Co-Chairman and Recorder for Electric Power Session Fifteenth Interagency Research Coordination Conference, 1987.

## **7. Honorary, scientific, and engineering societies:**

- Tau Beta Pi Member Miss State Univ. Mar 78
- Eta Kappa Nu Member Miss State Univ. Nov 77

## **8. Special recognition and/or awards:**

- U.S. Army - Research Development and Acquisition Award 1991 \*
- U.S. Army Science Conference - Honorable Mention Paper 1990 \*
- U.S. Army Waterways Experiment Station - R&D Award 1989
- Outstanding Performance Awards 1991-1998.
- U.S. Army Picatinny Arsenal - Cash award for Exceptional Performance 1997
- U.S. Army Commendation Medal 1975.
- ❖ The U.S. Army Research Development and Acquisition Award is the highest award for technical merit awarded by the Department of the Army.
- ❖ The U.S. Army Science Conference Award was issued by the Under Secretary of the Army in charge of Research and Development.

## **9. Patents:**

- Shock Hardened Data Acquisition System, U.S. PATENT No. 5,317,914 (38 Claims) issued on 7 Jun 1994.

## **10. Teaching Assignments:**

- MSU-EE8763 Finite and Infinite Machines : Jan-May 1997.
- MSU-EE6723 Microprocessors II : Aug-Dec 1991.
- MSU-EE2731 Digital Device.
- Undergraduate courses at Auburn and Jackson State University.

## **11. Professional Publications:**

- Franco, R.A., Phillips, G.G. 1998 “Improved Shock Hardened Data Acquisition System” Proceedings of the 68th Shock and Vibration Symposium, Baltimore MD.
- Franco, R.A., 1996 “Hardened Data Acquisition System for Harsh Environments” NASA Tech Briefs, Vol. 20 No.7.
- Oswald Robert, Director of Research & Development Chief Corps of Engineers, presented in Nov 96 by Dr. Oswald; Location and conference: Classified; Subject: The Electric Chair and the Physiological Effects of Electricity to Humans – research and draft paper prepared by Franco R.A.
- Franco, R.A., Owens J.K, 1995 “A Miniature, Shock Hardened, Transient Data Recorder”, Proceedings of the 66th Shock and Vibration Symposium, Vol.2 pp 147-156, Biloxi, MS.
- Franco R.A. 1995. “PAM Acceleration Measurements” presented to the PAM Red Team, at Picatinny Arsenal (PAM is a classified project).
- Franco, R.A., 1994 “Multi-Channel HDAS Penetration Data”, Proceeding of the Penetration Technology Coordination Group, Vicksburg, MS.

- Ingram, J.K., Franco, R.A., 1994. "MIDAC, A Miniature Integral Data Acquisition Canister for Blast Pressure Measurements Using the WES-Developed HDAS Autonomous Digital Data Acquisition System", WES Technical Report SL-94-5, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- Franco, R.A., Ingram, J.K., 1993. "A Self-Contained, Multi-Channel, Shock-Hardened Data Acquisition System", Defense Nuclear Agency Conference on Instrumentation for Nuclear Weapons Effects Testing (INWET'93), Menlo Park, CA.
- Franco, R.A., Ingram, J.K., 1991, "A Very High Shock Recorder", Proceedings IEEE Southeastcon, Institute of Electrical and Electronic Engineers, New York, NY.
- Franco, R.A., Ingram, J.K., 1991. "New Advances and Experiences with HDAS", Defense Nuclear Agency Conference on Instrumentation for Nuclear Weapons Effects Testing (INWET'91), Vicksburg, MS.
- Franco, R.A., Ingram, J.K., 1991 "Recent Experience with the CEWES-Developed Hardened Data Acquisition System (HDAS)," Proceedings of the 37th International Instrumentation Symposium, Instrument Society of America, pp 511-524, Albuquerque NM.
- Franco, R.A., Ingram, J.K., 1990. "A Very High Shock, Self-Contained Data Acquisition System", Army Science Conference, Durham, NC.
- Franco, R.A., Ingram, J.K., 1990. "A Super-Hardened, Self-Contained Digital Acquisition System", Proceedings of the 36th International Instrumentation Symposium, Instrument Society of America, pp 649-659, Research Triangle Park, NC.
- Franco, R.A., Ingram, J.K., 1989 "HDAS, A Miniature, Self-Contained, Super-Hardened, Digital Data Acquisition System (module)", Paper No. 78, Defense Nuclear Agency Conference on Instrumentation for Nuclear Weapons Effects Testing (INWET'89), Monterey CA.
- Franco, R.A., 1988. "A Self-Contained Shock Hardened (100Kg) Data Acquisition System, Report 1, Design and Development", WES Technical Report TR-0-88-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- Franco, R.A., 1987. "Networks of Markovian Queues", WES Technical Report TR-0-87-2, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

## **12. Work History and Assignments:**

### **A. Forensics Engineer & Fire Investigator**

- 1/98-Present: Forensic Engineering work for insurance companies and attorneys. I have testified in both Federal and State Court.

### **B. U.S. Army Engineering Research and Development Center, 3909 Halls Ferry Road, Vicksburg, MS 39180.**

- 12/98 - 9/03: Responsible for technically leading the Instrumentation Systems Development Division and acts as the chiefs in his absence. Plans and directs, and executes research, conception, design, development, construction and procurement of instrumentation systems for the U.S. Army Corp of Engineers and other government agencies. In addition, I continued my Shock Hardened Data Acquisition System (HDAS) research. I did research on battery behavior when subject to shocks above 10,000 g's. As a result, the power supplies in the HDAS were redesigned to be able to withstand a loss of power for 50 milliseconds. Also, the load regulation was greatly improved. Other power management changes were made that extended the time that the HDAS could record data from 30 minutes to over 6 hours. I also designed circuits to simulate varying line voltages and load conditions, and measured the HDAS performance under these conditions. I developed Java programs to interrogate, display data, and convert HDAS data files to other formats. Recently, I worked in the area of computer network performance. I directed the measurements of parameters to establish a baseline for our wide area network, setup a test bed, and ran software to simulate the networks and yield performance parameters.
- 05/97-11/97: Acting Chief of the Instrumentation Systems Development Division responsible for 22 electronics engineers and 28 electronics technicians. My responsibilities included: planning, directing, executing research, conception, design, development, construction, procurement, operations, maintenance/repair, staffing, assigning duties to positions, assisting employees in preparing career plans, training, performance appraisals, leave schedules, disciplinary action, facilities, equipment, and a 4 million dollar budget.
- 04/91-05/97: I managed and directed two other electronic engineers and three electronic technicians in designing, building, using, and transferring HDAS technology. During this period three new HDAS systems were designed. The first of these was a miniaturized version for one-seventh scaled penetration weapon. The second was a multi-axis four channel HDAS. The third was a HDAS system that accepted commands and returned its data over a fiber optic network. During this period over 200 HDAS units were produced in-house.

- 9/88-4/91: I designed semi-customer integrated circuits and redesigned the HDAS with surface mount components to reduce its size. I managed the production of HDAS units, developed field methodology and directed its use on explosive effects field test. I developed validation techniques for the HDAS. I managed the software design to interrogate the HDAS and produce engineering plot in the field.
- 02/87-09/88: Designed and validated the ERDC's first shock hardened data acquisition system (HDAS). The shock hardness of the HDAS, 100,000 g's, was validated by placing it inside a projectile that was fired from a 155 mm howitzer into a 1-ft thick reinforced concrete target. The recorder contained an analog section with a 100 KHz frequency response, an 11-bit analog-to-digital converter with a sampling rate of 1,000,000 samples per second, and a 131,072 x 16-bit memory.
- 2/79-2/87: I designed and implemented two microprocessor based protocol converters. One served as the interface between a Lockheed data recorder and a satellite uplink, and the other interfaced a data recorder to a computer. I designed a microprocessor based voice synthesizer for interrogation of remote water stage recorders, and I designed a system to automatically interrogate other remote data acquisition systems over the phone. I worked on various research projects including: thermal camouflage, the detection of faults in railroad bed, and the measurement of silt in rivers. During this period, the following educational leave was taken: 6/80-5/81 Mississippi State University; 9/81-9/82 Auburn University; 9/82-5/84 Mississippi State University.
- 3/76-2/79: I designed analog circuits used to amplify and buffer signal from explosive effects transducers. I fielded and recorded measurements on various explosive tests including one underground nuclear test. During this period education leave for MS degree was taken from 8/77-5/78 and from 8/78-12/78.
- 1/75-3/76: I completed the designed and debugged the design of discrete logic data acquisition system used for hydrological surveys. The project had not been completed due to the design engineer leaving the organization for a promotion.

### **13. Court Appearances:**

#### **Federal Court:**

- United States District Court, Southern District of MS, Jackson Division  
Civil Action No. 300CV171LN - Nationwide Insurance vs. Ronald Hughes  
Arson Fire - Testified for Plaintiff (Nationwide Insurance)  
Deposition: 18 January 2001  
Court Testimony: 15 February 2001  
Plaintiff's Attorney: Patrick Tatum / Firm: Upshaw, Williams, Biggers, Beckham  
& Riddick  
Defense's Attorney: Crymes M. Pittman / Firm: Pittman, Germany, Roberts  
& Welsh

#### **State Court:**

- Circuit Court of Franklin County, AL  
State of Alabama vs. Christie Michelle Scott - Case No.: CC08-344  
Capital Murder Arson  
Testified for Prosecution  
Court Testimony: 18-19 July 2009  
District Attorney: Joey Rushing / Franklin County  
Defense Attorney: Robert B Tuten / Law Office of Robert Tuten
- Circuit Court of Alcorn County, MS  
Civil Action No. 97-466R-A - Nathan Craig vs. SSSS&P (dba Executive Inn)  
Electrical Shock Accident - Testified for Plaintiff  
Court Testimony: 20 November 2001  
Plaintiff's Attorney: Dean Andrews / Firm:/ H. Dean Andrews (Sole Practitioner)  
Defense's Attorney: Kent Smith / Firm: Webb, Sanders, Balducci & Smith

#### **Depositions:**

- U.S. District Court For The Southern District of Mississippi  
Civil Action No.: 2:09CV16-KS-MTP  
MetLife vs. Clayco Construction Group, LLC  
Residential Fire While Roof Was Being Repaired  
Deposition for Plaintiff on 22 September 2009  
Plaintiff's Attorney: Christopher Deaton / Deaton and Deaton PA  
Defense Attorney: David M. Otts, Bryan Nelson PA – Attorney at Law

- U.S. Eastern District of Texas  
 Jason Richards vs. Lasko Products and JEH Stallion Station  
 Cause No.: 6:07cv533  
 Fire – Death of Race Horses  
 Deposition for Plaintiff on 7 July 2009  
 Plaintiff's Attorney: Jeff Embry / Hossley and Embry LLP  
 Defense Attorneys: John Freedenberg / Firm: Goldberg Segalla LLP  
 Tom Stollenwerch / Firm: Touchstone Bernays, LLP
- 19<sup>th</sup> JDC/EBR Parish, LA; Suite No. 512779, Sec 23  
 James Harrison vs. Entergy and Phillips Electric  
 Electrical Shock Accident  
 Deposition for Defense (Phillips Electric): 11 April 2008  
 Plaintiff's Attorney: J Kenton Parson / Firm: Roedel, Parsons, Kock, Blache,  
 Balhoff and Mccollister  
 Defense's Attorney: Brian Butler / Firm: Maricle and Associates
- Circuit Court of Lafayette County, MS  
 Case No. LOS-493  
 Stella Bell vs. Graceland Care Center, Med-Lift Mobility & Hubbell Products.  
 Electrical Burns from a Lift Chair  
 Deposition for Defense (Graceland Care Center): 5 October 2007.  
 Plaintiff's Attorney: Carter Hitt / Firm: Hughes & Hitt PA  
 Defense's Attorney: Andy Lowery / Firm: Copeland, Cook, Taylor & Bush PA.
- Circuit Court of Amite County, MS - Civil Action No. 04-CV-139J  
 Linda Murray on Behalf of Bobby Murray vs. Magnolia Electric Power Assoc.  
 Wrongful Death - Electrocution  
 Deposition for Plaintiff's: 25 January 2007  
 Plaintiff's Attorney: Kelley M. Berry/ Firm: Shannon Law Firm  
 Defense's Attorney: Bradley F. Hathaway / Firm: Campbell Delong
- Circuit Court of Quitman County, MS  
 Civil Action No. 2003-0136  
 Tracy Denica Smith vs. TPI Corporation  
 Fire / Wrongful Death - 1 Adult / 2 Minors  
 Deposition for Defense: 15 November 2005  
 Plaintiff's Attorney: Michael D. Greer / Firm: Greer, Pipkin & Russell  
 Defense's Attorney: Martin R. Jelliffe / Firm: Wise, Carter, Child & Caraway
- Circuit Court of Jackson County, MS  
 Civil Action No. C1-2000-00, 286(1)  
 Angela Cunningham Minor, et al vs. Singing River, EPA  
 Electrical Shock Accident  
 Deposition for Plaintiff: 25 September 2001  
 Plaintiff's Attorney: Herbert Lee / Firm: Lee & Associates

Defense's Attorney: James N. Compton / Firm: Compton, Crowell & Hewitt

- Circuit Court of Coahoma County, MS  
Civil Action No. 14-C1-97-0080  
Vanessa Hayes vs. Entergy Mississippi and Baker Engineer  
Fire - Wrongful Death - 3 minors  
Deposition for Defense of Baker Engineering: 25 August 1999  
Plaintiff's Attorney: Charles M. Merkel Jr. / Firm: Merkel & Coker  
Defense's Attorney: Forrest Stringfellow / Firm: Daniel, Coker, Horton & Bell

#### **14. Fee Schedule:**

- Law Firms & Attorneys: Hourly Rate: \$160, Mileage \$0.50, Depositions and Trails: Minimum Fee of \$850.00 per day, Other Expenses: At Cost.
- Insurance Companies & Adjusters: Hourly Rate: \$160, Mileage \$0.50, Travel Time: 20% Discount if over 5 hours, Other Expenses: At Cost.

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