

Marcus J. Johnson

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CAREER PROFILE

COMPANY PRESIDENT ▪ SENIOR APPLICATIONS ENGINEER ▪ NDT ENGINEER ▪ PROJECT MANAGER ▪ CONSULTANT

- **Senior Applications Engineer** with a company specializing in the production of a technology for depositing nano-particle inks; applications can be found in the semiconductor, sensor and biotechnology industries.
- **President of Electromagnetic Sensor Solutions, Inc.** A small company specializing in the sale of position transducers and providing design consultancy in the areas of nondestructive evaluation and industrial sensing.
- **NDT Engineer** with an effective combination of engineering design, computation, and scientific skill used to interact extensively with industry personnel to implement nondestructive inspection systems, measurements, and techniques. **Specific expertise in pulsed and time-harmonic eddy-current techniques and instrumentation.** Well-rounded background utilizing strong analytical, technical, and project management skills.
- **Ten years of R&D experience** executing programs to create new experimental hardware and samples that provide solutions to engineering problems. Experience with mixed-signal PCB design using CADSTAR and other packages. Excellent communication skills. Accomplished public speaker.
- **Ten years of 'C' programming experience** on UNIX and Windows platforms and **six years of Matlab** experience. Good knowledge of 8086 Assembler, FORTRAN, Microsoft Visual C++, and Rhino 3D. Regular use of LaTeX, MS Excel, MS Project, many packages on SUN-UNIX, MS Windows, NT and DOS platforms. Some knowledge of SQL. Skill sets:

ANALOG/DIGITAL CIRCUIT & PCB DESIGN ▪ COMPUTATIONAL ALGORITHMS IN MATLAB ▪ FORTRAN
ELECTROMAGNETIC SENSOR DESIGN ▪ BETA-SITE TESTING ▪ EXPERIMENTAL ELECTROMAGNETICS

CAREER PATH

CENTER FOR NONDESTRUCTIVE EVALUATION, IOWA STATE UNIVERSITY, AMES, IA

1997 – PRESENT

Associate Scientist / Consultant (1999 – 2005) **Postdoctoral Research Associate (1997 – 1999)**

Conduct research under NSF program linking universities with industry in areas including the interaction of conventional and pulsed eddy currents with stratified ferromagnetic conductors as well as the use of eddy currents for materials characterization and inspection. Utilize magnetic force microscope (MFM) and vibrating sample magnetometer (VSM). Split appointment with Ames Laboratory during postdoctoral research. Supervise undergraduate and graduate students.

Career Highlights:

- Redesigned pulsed eddy-current technology for airframe inspection to detect cracks and corrosion under \$1 million research contract funded by FAA. Designed new instrumentation based on CompactPCI standard and development of inspection algorithms.
- Collaborated with ABB Steel to research transformer materials improvements in efficiency through three-year study under NSF GOALI (Grant Opportunities for Academic Liaison with Industry) program to determine feasibility of laser treating amorphous metals. Developed system for performing laser-surface scribing on metallic ribbons used in transformer cores and presented results at professional conference.
- Worked closely with industry personnel from Fortune 500 and other companies including Boeing, Cessna, Alcoa, Caterpillar, Westinghouse, and ABB Steel to solve inspection problems, both as part of NSF Industry/University Cooperative Research Program, and under individual contracts.
- Researched pulsed and time-harmonic eddy-current techniques for characterizing case-hardened steel samples and the Barkausen technique and its application to the inspection of magnetic materials.

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- Hired twice as assistant expert witness to research and prepare presentation material for legal cases involving court action.

CAREER PATH (continued)

THE UNIVERSITY OF SURREY, GUILDFORD, UK

1995 – 1997

Research Associate

Hired for 18-month contract by Rolls-Royce to improve the reliability of eddy-current inspection of turbine discs.

- Developed PC-based application using Microsoft Visual C++ and Matlab to analyze eddy-current data files and discriminate between various different flaw indications. Model-based inversion and deconvolution schemes were implemented for sizing fatigue cracks.

CONTRACT / CONSULTANT EXPERIENCE

1992 – 1996

The University of Surrey, Guildford, UK

- Worked with small team in Civil Engineering department to develop application using MS Visual C++. Goal was to create new graphic front end for their existing DOS-based engineering-structure generation and visualization software.

Hocking NDT (Non-destructive Testing), St. Albans, UK

- Conducted feasibility study to investigate use of transient eddy-current signals for measurement of case-depth on hardened steel rods.

Rolls-Royce (Aero-Engine Group), Bristol, UK

- Developed feasibility study to investigate use of transient eddy-current signals for measurement of case-depth on hardened steel bars and depth of aluminizing on nickel components.

SHEFFIELD CITY POLYTECHNIC, SHEFFIELD, UK

1991 – 1992

Research Assistant

- One-year consultative contract position funded by Tinsley Wire (Sheffield) Ltd. Developed on-line eddy-current inspection system for measuring thickness of zinc on galvanized steel wire. Successful third-generation prototype cloned and installed on multiple lines.

ACADEMIC BACKGROUND

Ph.D., Physics, The University of Surrey, Guildford, UK 1995**Focus: Experimental Electromagnetics****Thesis: Pulsed Eddy-Current Measurements for Materials Characterization and Flaw Detection**

- Developed PC-based pulsed eddy-current (PEC) instrumentation and software. Subsequent use of the PEC system with Hall-device, absolute, reflection and differential probes for imaging flaws and corrosion in conducting plates. Comparison of experimental results with theoretical predictions and development of a model-based inversion scheme for quantitative evaluation of corrosion.

B.S., Engineering Physics (2.1), Honors Program, Sheffield City Polytechnic, Sheffield, UK 1991

- Project: Developed from first principals of computer program to perform Fast Fourier Transfer (FFT). Used program to analyze vibration modes in cold-rolling mill at British Steel research line.

MEMBERSHIPS

Institute of Electrical and Electronic Engineers (IEEE)

American Society for Nondestructive Testing (ASNT)