

CURRICULUM VITAE

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EDUCATION

The University of Surrey, Guildford, Surrey, United Kingdom.
Ph. D. in the Department of Physics, 1997.

Transient eddy-currents for the characterization of thin layers and surface treatments.

Sheffield Hallam University, Sheffield, South Yorkshire, United Kingdom.
BSc. (Honors) in Engineering Physics; 2-1 (UK grade system).

TEACHING HIGHLIGHTS

Adjunct faculty, **Des Moines Area Community College**, Boone, IA. Teach calculus, business calculus and C++ programming classes.

Adjunct faculty, **ITT Technical Institute**, Woodbury, MN. Teach introductory general science class covering the physical and biological sciences and basic math.

Supervised graduate students working at the **Center for Nondestructive Evaluation** (CNDE), **Iowa State University** (ISU). Assisted students with their research and acted as a mentor to them.

Supervised numerous **Senior Design Project** teams from ISU's **Electrical and Computer Engineering** (E&CpE) department and **Integrated Design** students from the **Materials Science and Engineering** (MSE) department.

Received a letter of acknowledgement from the ISU **Vice President of Student Affairs** as a person who contributed to the outstanding achievements of a student scholar. Attended the student award ceremony at C.Y. Stephens Auditorium in this capacity.

Taught an **undergraduate nondestructive evaluation class** while the regular professor was on sabbatical.

Mentored undergraduate and high-school **Program for Women in Science and Engineering** (PWSE) students at ISU.

Taught graduate and undergraduate laboratory classes at the University of Surrey in the areas of microcontroller and microprocessor hardware systems and programming and FORTRAN programming. Graded assignments.

RESEARCH INTERESTS

Experimental electromagnetism for:

- eddy-current and magnetic nondestructive evaluation
- pulsed eddy-current nondestructive evaluation
- electrical and magnetic sensors

Novel (nanoparticle) materials deposition techniques for:

- high-density and conformal interconnects
- miniature sensors
- embedded sensors, antennas and electronics

Materials characterization:

- electromagnetic profiling of steels
- characterization of thin layers and surface treatments using high-frequency electromagnetic techniques
- assessment of residual stress

CURRENT AND PREVIOUS POSITIONS

President, EM Sensors, Inc., Ames, IA. 2005-2008.

A small company specializing in the sale of position transducers and providing design consultancy in the areas of nondestructive evaluation and industrial sensing.

Adjunct Faculty, Des Moines Area Community College, Boone, IA. 2007-present.

Teach calculus, business calculus and C++ programming.

Adjunct Instructor, ITT-Technical Institute, Woodbury, MN, 2007.

Teach introductory ‘Survey of the Sciences’ class.

Senior Applications Engineer, Optomec Design Company, St. Paul, MN, 2005-present.

Work with universities and industry to develop new applications for Optomec’s materials deposition technology in the areas of electromagnetic sensors, sensor networks and antennas, RFID and interconnects for the semiconductor industry. Job function includes proposal writing, fundamental research and customer applications development. Have written successful SBIR proposals and took the lead on a multi-million dollar DARPA proposal.

Associate Scientist, Center for Nondestructive Evaluation, ISU, Ames, IA, 1999-2005.

Research Associate, Center for Nondestructive Evaluation, ISU, Ames, IA, 1997-1999.

Conducted research under CNDE’s Industry/University NSF program in addition to Air Force, FAA, and NASA programs. Played a key role in the work associated with these contracts including reporting and presentation activities. Research areas included 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. Had numerous supervisory roles involving postdoctoral fellows, graduate and undergraduate students.

Postdoctoral Research Fellow, Ames Laboratory and Iowa State University, Ames, IA, 1997-1999.

Split appointment between Ames Laboratory and the Center for Nondestructive Evaluation. Worked in the area of magnetic and eddy-current nondestructive evaluation under the NSF Industry/University program.

Postdoctoral Research Fellow, The University of Surrey, Surrey, United Kingdom, 1995-1997.

Researcher, Sheffield City Polytechnic, Sheffield, South Yorkshire, United Kingdom, 1991-1992.

Engineer, Schlumberger Industries, Bognor Regis, West Sussex, United Kingdom, 1989-1990.

OTHER POSITIONS AND INFORMATION

President of EM Sensors, Inc. A small company specializing in the sale of position transducers and providing design consultancy in the areas of nondestructive evaluation and industrial sensing.

Chaired sessions at both QNDE and ENDE conferences in the field of nondestructive evaluation.

Participated in NSF panel reviews.

Invited review paper. *Magnetic Measurements for NDE: Background, Implementation and Applications*, Indian Society for Non-Destructive Testing's Journal of Non-Destructive Evaluation, Vol. 20, No. 4, 2000.

Reviewer for:

- IEEE Transactions on Magnetism
- Journal of Nondestructive Evaluation
- Journal of Materials Research
- Electromagnetic Nondestructive Evaluation
- Nondestructive Testing and Evaluation International

Full member of IEEE, IMAPS and ASNT.

REFERENCES

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PATENTS

Patent application. Patent application #20050184729, *Method and Apparatus for Forming Coil for use in Eddy Current Sensing Probe*, applied for in 2005.

REFEREED PUBLICATIONS

M. J. Johnson, C. C. H. Lo, S. Hentscher and E. Kinser, *Analysis of Conductivity and Permeability Profiles in Hardened Steel*, 9th Annual Symposium of Electromagnetic Nondestructive Evaluation, East Lansing, Michigan, pp135-142, 2004.

B. Zhu, **M. J. Johnson**, C. C. H. Lo and D. C. Jiles, *Multifunction Magnetic Barkhausen Emission Measurement System*, IEEE Transactions on Magnetics, Vol. 37, No. 3, May 2001, pp1095.

B. Zhu, **M. J. Johnson**, C. C. H. Lo and D. C. Jiles, *Evaluation of Wear-Induced Material Loss in Case-Hardened Steel using Magnetic Barkhausen Emission Measurements*, IEEE Transactions on Magnetics, Vol. 37, No. 3, May 2001, pp1095.

M. J. Johnson, R. Chen, D. C. Jiles and V. R. Ramanan, *Reducing Core Losses in Amorphous $Fe_{80}B_{12}Si_8$ Ribbons by Laser-Induced Domain Refinement*, IEEE Transactions on Magnetics, Vol. 35, No. 5, pp3865.

J. R. Bowler and **M. J. Johnson**, *Pulsed Eddy-Current Response to a Conducting Half-Space*, IEEE Transactions on Magnetics, Vol. 33, No. 3, 1997.

PUBLICATIONS

V. J. Garcia, D. M. Clatterbuck, C. C. H. Lo, **M. J. Johnson** and D. C. Jiles, *Dynamical Assessment of Magnetic Barkhausen Signals*, Review of Progress in Quantitative Nondestructive Evaluation, Vol. 19A, pp781.

D. M. Clatterbuck, V. J. Garcia, **M. J. Johnson** and D. C. Jiles, *Modeling of the Magnetic Barkhausen Effect*, Review of Progress in Quantitative Nondestructive Evaluation, Vol. 19B, pp1533.

M. J. Johnson, B. Zhu, C. C. H. Lo, D. C. Jiles and R. E. Shannon, *The Effects of Aging Time and Temperature on the Magnetic Properties of Nickel Alloys*, Review of Progress in Quantitative Nondestructive Evaluation, Vol. 20B, pp1429.

M. J. Johnson, C. C. H. Lo, B. Zhu, H. Cao and D. C. Jiles, *Magnetic Measurements for NDE: Background, Implementation and Applications*, invited review article for the Indian Society for Non-Destructive Testing's Journal of Non-Destructive Evaluation, Vol. 20, No. 4, pp11, 2000.

D. J. Brown, C. M. Hils and **M. J. Johnson**, *Massively Multiplexed Eddy Current Testing and its Comparison with Pulsed Eddy Current*, Review of Progress in Quantitative Nondestructive Evaluation, AIP Conf. Proc. 700, 390 (2004).

- D. Utrata and **M. J. Johnson**, *Development of Magnetic Particle Method for Forensic Recovery of Serial Numbers*, Review of Progress in Quantitative Nondestructive Evaluation, AIP Conf. Proc. 700, 1438 (2004).
- M. J. Johnson**, C. C. H. Lo, and L. Naidu, *Hall-Effect Measurements under AC Excitation for the Reconstruction of Obliterated Serial Numbers in Magnetic Steels*, Review of Progress in Quantitative Nondestructive Evaluation, AIP Conf. Proc. 700, 1445 (2004).
- M. J. Johnson**, J. R. Bowler and F. Azeem, *Pulsed Eddy-Current NDE at Iowa State University — Recent Progress and Results*, Review of Progress in Quantitative Nondestructive Evaluation, Vol. 22, pp390.
- M. J. Johnson**, D. C. Jiles, C. C. H. Lo, P. Zombo, and B. Zhu, *Magnetic NDE measurements on 410 stainless steel: An on-site and laboratory evaluation*, Review of Progress in Quantitative Nondestructive Evaluation, Vol. 21, pp1591.
- M. J. Johnson**, L. C. Kerdus, C. C. H. Lo, J. E. Snyder, J. Leib, S. J. Lee, M. Mina, and D. C. Jiles, *Studies on the effects of pulsed-magnetic field treatment on magnetic materials*, Review of Progress in Quantitative Nondestructive Evaluation, Vol. 21, pp1569.
- H. Sun, J. R. Bowler, N. Bowler, and **M. J. Johnson**, *Eddy Current Measurements on Case Hardened Steel*, Review of Progress in Quantitative Nondestructive Evaluation, Vol. 21, pp1561.
- M. J. Johnson**, J. Zhou, B. Zhu, N. Nakagawa, and D. C. Jiles, *Evaluation of Wear-Induced Material Loss in Case-Hardened Steel*, AIP Conf. Proc. 509, 1465 (2000).
- D. L. Nelson, **M. J. Johnson**, and N. Nakagawa, *A Database Design for the Storage and Statistical Analysis of Impedance Data for the Characterization of Noise In Eddy-Current Scans*, AIP Conf. Proc. 700, 613 (2004).
- H. Sun, R. Ali, **M. J. Johnson** and J. R. Bowler, *Enhanced Flaw Detection Using an Eddy Current Probe with a Linear Array of Hall Sensors*, AIP Conf. Proc. 760, 516 (2005).
- M. J. Johnson**, N. Nakagawa, S. E. Wendt, S. R. Hentscher, D. L. Nelson, K. T. Buhr, B. A. Kilbough, and D. C. Raithel, *Studies into the Effects of Surface Roughness on Spatial Eddy-Current Data from Nickel-Based Engine Alloys*, AIP Conf. Proc. 760, 425 (2005).
- M. J. Johnson** and J. R. Bowler, *Inversion of Transient Eddy-Current Signals for the Determination of Conducting Plate Parameters*, Review of Progress in Quantitative Nondestructive Evaluation, Vol. 14A, pp849-856, 1994.
- M. J. Johnson** and J. R. Bowler, *Model-Based Inversion of Transient Eddy-Current Signals*, *Studies in Applied Electromagnetics and Mechanics*, Vol. 10, International Symposium on Nonlinear Electromagnetic Systems (ISEM), pp495-498, 1995.
- J. R. Bowler and **M. J. Johnson**, *Advances in Transient Eddy-Current Nondestructive Evaluation*, *Studies in Applied Electromagnetics and Mechanics*, Vol. 10, International Symposium on Nonlinear Electromagnetic Systems (ISEM), pp623-627, 1995.