

Ronald Brett Michaels

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Educational Background

B.S. in Engineering Physics, University of Tennessee, June 1970

M.S. in Engineering Science, University of Tennessee, December 1991

Ph.D. in Engineering Science – Modern Computational Methods, University of Tennessee,
August 1997

Interests

Algorithmic Development

Optimization

Artificial Intelligence

 Pattern Recognition

 Neural Networks – Hebbian Learning

 Fuzzy Logic

Cognitive Science

Image Processing and Analysis

 Convolution

 Mathematical Morphology

Work Experience

Phenotype Screening Corporation 6/04 to Present

Technical Director for company doing plant root visualization. Conceptual Development of method for plant root visualization system using low energy x-ray digital imaging.

Hardware and software design of x-ray system. Development of low density materials for plant growth. Development of algorithms and software for image analysis of plant root images using convolution and mathematical morphology. Development of algorithm for Data Fusion. Development of Data Clustering software. Patent. Registered Staff Inspector with State of Tennessee Department of Environment and Conservation , Division of Radiological Health.

Industrial Analytics Corporation 10/99 to 7/04

President of company serving the metal casting industry. Research and development work for the Lost Foam Casting process. Develop sensors and methods for analysis of EPS foams as used in the casting process. Software development. Data acquisition and analysis using wavelets. X-ray system design and implementation.

Quintek Corporation 2/99 to 8/99

Algorithmic Design Consultant for project to develop an inspection system for a ball bearing manufacturer. Conceptual design for optical and eddy current sensors. Design and prototype intelligent data analysis algorithms. Patent Disclosure.

Oak Ridge Institute for Science and Education 7/95 to 7/96

Conducted dissertation research at Instrumentation and Controls Division, Oak Ridge National Laboratory under U. S. Department of Energy Laboratory Graduate Research Participation Program.

Pellissippi State Technical College 1/94 to 5/94

Adjunct Instructor, Dept. of Computer Science Technology. Taught CST 1010 Introduction to Computers and Operating Systems.

University of Tennessee 1/92 to 5/94

Graduate Assistant in Department of Engineering Science and Mechanics. Taught BE 101 Computer Programming.

Harare Polytechnic 5/85 to 12/89

Lecturer in Civil Engineering at post secondary technical college in Zimbabwe. Examiner on the National Examinations Board.

University of Tennessee 1/85 to 4/85

Graduate Teaching Assistant in Department of Computer Science. Taught FORTRAN at Junior level.

Tucker Steel Company 3/84 to 5/84

Heavy Haulage Consultant. Tucker built bridge girders so large they could not ship them. I found a way. Structural Analysis of bridge girders.

Polysius Corporation 7/82 to 7/83

Material Controller and advisor to Suez Cement Company, Egypt. Advised the client in the receiving, handling, storage and issue of US\$ 100 million of cement plant equipment, working with Egyptian engineers, storekeepers, and warehousemen.

12/80 to 12/81 Medical disability.

Fuller Company 1/78 to 12/80

Resident Manager. Responsible for accomplishment of all in-country work for a US\$ 20 million construction project in Ghana.

King Faisal Hospital 6/76 to 8/77

Structural Engineer at hospital in Saudi Arabia. Construction contract management.

Nixon Machinery Co. 9/75 to 5/76

Structural Design and Erection Supervision of coal processing plant. Proposal work.

Beverly Steel Corp. 11/72 to 9/75

General Engineer for small structural steel fabricator. Machine design and construction. Structural design and detailing.

U.S. Peace Corps 7/70 to 11/71

Mechanical Superintendent, Mole Game Reserve, Ghana.

University of Tennessee 9/67 to 11/71

Undergraduate Research Technician under Dr. Archie Mathews. Experimental stress analysis.

U.S. Navy 3/63 to 3/67

Electronics Technician, Helicopter Crewman, E-5.

Other Experience

Management of rental property for self and others. Renovation and repair of houses. Land subdivision.

Memberships

The Institute of Electrical and Electronic Engineers, Tennessee Farm Bureau.

Honors and Awards

Phi Eta Sigma, Phi Kappa Phi, Tau Beta Pi, Sikorsky Rescue Award

Patent

Daniel W. McDonald and Ronald Michaels, "Plant Root Characterization System", US Patent no. 7278236, issued 10/09/2007.

Daniel W. McDonald and Ronald Michaels, "Plant Root Characterization System", People's Republic of China Patent no. ZL 200680015951.X, Date of Grant and Announcement: September 05, 2012.

Publications, Presentations

D. W. McDonald, Ernest C. Bernard, Bonnie Ownley, Ronald Michaels, David Weaver, "Nematode Susceptibility Rankings from Soft-Tissue X-ray Imaging", Presented at 2013 Beltwide Cotton Conferences, January 10, 2013.

Ernest C. Bernard, D. W. McDonald, R. Michaels, and B. H. Ownley, "X-ray Imaging of Root systems Infected with Endoparasitic Nematodes", presented at Southern Branch, American Society of Agronomy meeting in Birmingham, Alabama, February 5 – 7, 2012.

Kenton E. Dashiell, Deirdre A. Prischmann-Voldseth, Daniel W. McDonald, Ronald B. Michaels, Robert J. Kodrzycki, Nancy L. West, Jeremy R. Allbright and David J. Schneider, "Automated X-Ray Image Analysis Methods for Investigating Root Architecture of Corn Rootworm Resistant and Susceptible Maize Varieties", presented at ASA, CSSA, and SSSA International Annual Meetings, Oct 16-19, 2011.

Kodrzycki, R. J., McDonald, D.W., Swanson, M.E., Kallestad, J.C., Michaels, R. B., Stanton, B.J., "Windthrow Resistance Screening Based on Non-destructive, Low Energy X-Ray Imaging of Early Root Emergence from Poplar Hardwood Cuttings", poster at the 5th International Symposium of Physiological Processes in Roots of Woody Plants August 8, 2010.

Moffitt, Ronald D., DePolo, Wade S., Tung, J., Michaels, Ronald B., "Foamed Growth Medium for X-Ray Visualization of Plant Root Systems" Society of Plastics Engineers: ANTECTM 2010, Orlando, Florida USA, May 16-20, 2010.

Kodrzycki, Robert, J., Michaels, Ronald, B., Friend, Alexander, L., Zalesney, Ronald, S., Mawata, Christopher, P., and McDonald, Daniel, W. "Non-Invasive Analysis of Developing Poplar and Willow Root System Morphology Using X-Ray Imaging." 4th International Symposium on Physiological Processes in Roots of Woody Plants. Bangor, UK September 17, 2008

Robert J Kodrzycki, Ronald B Michaels, Alexander L Friend, Ronald B Zalesney, Christopher P Mawata, Daniel W McDonald. "Non-Destructive Digital Imaging Of Root Systems Allows Detailed Analysis Of Poplar Rooting Dynamics." Plant & Animal Genomes XVII Conference. San Diego, CA. January 10-14, 2009

David Page, Andraeas Koschan, Mongi Abidi, Ron Michaels, and Dan McDonald. "Novel X-ray imaging and segmentation of root structures." Sensor Review, V. 28, No. 1:46, 2008.

Kodrzycki, Robert, J., Michaels, Ronald, B., Friend, Alexander, L., Zalesney, Ronald, S., Mawata, Christopher, P., and McDonald, Daniel, W. "Non-Invasive Analysis of Developing Poplar and Willow Root System Morphology Using X-Ray Imaging." 4th International Symposium on Physiological Processes in Roots of Woody Plants. Bangor, UK. September 17, 2007.

Kodrzycki, Robert, J., Michaels, Ronald, B., and Mawata, Christopher, P., and McDonald, Daniel, W. "RootViz FS: A Tool for Rapid, Non-Invasive and Dynamic Imaging of Root Morphology." 4th International Symposium on Physiological Processes in Roots of Woody Plants. Bangor, UK. September 17, 2007.

A.L. Friend, E.A. Lilleskov, R.S. Zalesny, Jr., R. Michaels, and D.W. McDonald. "Belowground management of trees: Novel perspectives on imaging". Workshop 5: Roots-- Now in 3D! 3-D Root Architecture, Imaging and Its Use in Structural --Functional Models, HortScience 42(4):799.

Fred Allen, Dan McDonald, Richard Johnson and Ronald Michaels. "X-ray Based Soybean Root Visualization and Characterization." American Society of Agronomy. Orlando, FL. February 7, 2006.

Ronald Michaels and Daniel McDonald, "Plant Root Imaging Using Low Energy X-Ray Technology", Presented at The 51st International Instrumentation Symposium, 8 -12 May 2005, Knoxville, Tennessee.

Ronald Michaels, "Digital x-ray system images EPS foam", Vision Systems Design, May, 2005. Accessed 25 February 2013.
<http://www.vision-systems.com/articles/print/volume-10/issue-5/features/spotlight-on-x-ray-imaging/digital-x-ray-system-images-eps-foam.html> .

D. Penumadu, M. Kant, R. Michaels and E. Lichner, "Lost Foam Casting Using Electromagnetic Pump Avoiding Down-Sprue with Feedback Control", presented at American Foundry Society CastExpo '05, April 16-19, 2005, St. Louis, Missouri, USA.

R. S. Benson, D. Penumadu, R. Michaels and I. Sen. "Thermal and Morphological Characterization of EPS Foam and Relationship with Processing Parameters", presented at American Foundry Society 108th Metalcasting Congress, June 12-15, 2004, Rosemont, Illinois, USA.

Ronald Michaels, Roberto Benson, Dayakar Penumadu, Thorsten Graeve and Gene Weckler. "Use of X-Ray Radiography to Characterize the Structure of Expanded Polystyrene Foam", presented at Digital Imaging IV, 28-30 July, 2003, Unacsville, Connecticut, USA.

D. Penumadu, R. Benson, and R. Michaels "Qualitative and Quantitative Description of EPS Foam for Lost Foam Casting", presented at American Foundry Society 107th Metalcasting Congress, April 26-29, 2003, Milwaukee, Wisconsin, USA.

Ronald Michaels and Graham Walford, "Minimization of Pattern Property Variations as a Path to Minimization of Casting Defects". February, 2001. Presented at the Lost Foam Consortium Meeting, Birmingham, AL.

G. V. Walford and Ronald Michaels. "Measurement of Lost Foam Properties and Their Application To The Casting Process". June 2000. Presented at the Lost Foam Consortium Meeting, Des Plaines, IL.

G. V. Walford and Ronald Michaels. "Density, Coating and Bead Fusion Measurements for the Inspection of Lost Foam Patterns". December 1999. Presented at the AFS 104th Casting Congress, Pittsburgh, PA.

G. V. Walford and Ronald Michaels. "Density, Coating and Bead Fusion Measurement in the Inspection of Lost Foam Properties". October 1999. Presented at the Lost Foam Consortium Meeting, Des Plaines, IL.

Ronald Michaels and Belle R. Upadhyaya. "A Complex Valued Neural Network with Local Learning Laws". *Smart Engineering System Design: Neural Networks, Fuzzy Logic , Evolutionary Programming and Complex Systems*, edited by Dagli *et al.* ASME Press, New York, 1999.

Ronald Brett Michaels. "*A Multistage Neural Network Using Local Learning Rules*", Ph.D. Dissertation, The University of Tennessee, 1997.

Ronald Michaels. "Associative Memory with Uncorrelated Inputs", *Neural Computation*, vol. 8. pp. 256-259.

Ronald Michaels. "A High Order Neural Network Employing Adaptive Architecture". *Science of Artificial Neural Networks*. SPIE vol. 1710, pp. 20-31. 1992.

Ronald Michaels. "A Learning Algorithm Based on Feature Generation and Feature Selection". *Intelligent Engineering Systems Through Artificial Neural Networks*, pp. 79-84. edited by Dagli *et al.* ASME Press, New York, 1992.

Ronald Brett Michaels. "*A Self Configuring High-Order Neural Network*", M.S. Thesis, The University of Tennessee, 1991.