

BRUCE R. McLEOD

Date and Place of Birth: January 17, 1939, Greeley, CO

Education:

B.S. in EE, Colorado State University, 1961
M.S. in EE, University of Colorado, 1965
Ph.D. in EE, University of Colorado, 1968

Experience:

1961-1964 Electrical Engineer, Light Military Electronics Department, The General Electrical Company, Utica, NY
1968-1970 Research Engineer, Boeing Aerospace Group, The Boeing Company, Seattle, WA
1970-1974 Assistant Professor, Electrical Engineering Department, Montana State University (MSU), Bozeman, MT
1974-1979 Associate Professor, Electrical Engineering Department, MSU
1979-1981 Professor, Electrical Engineering Department, MSU
1981-1982 Visiting Research Scientist at (1) Columbia Presbyterian Hospital, New York City, NY (with Dr. Art Pilla), (2) Jerry L. Pettis Memorial VA Hospital (with Dr. Ross Adey), and (3) University of Kentucky Medical Center (with Drs. Steve Smith and Betty Sissen).
1982-1989 Professor, Electrical Engineering Department, MSU
1989-1990 Full time Consultant with OrthoLogic Inc. (formerly IatroMed Inc.) , Phoenix, AZ
1990-1996 Professor, Electrical Engineering Department, MSU
1996-1999 Department Head, Electrical Engineering Department, MSU
1999-2005 Dean of the College of Graduate Studies, MSU
2005- Professor, Electrical and Computer Engineering Department, MSU

University Service

EE Department Graduate Coordinator, 1985 to 1999
EE Department Promotion and Tenure (P&T) Committee; Chairman, College of Engineering P&T Committee, 1996
Ten Graduate Committees (Masters), Chairman & Advisor; Mentor, 4 Ph.D. Students
EE Department Curriculum Committee, Electromagnetic Fields Option
Montana State University (MSU) Graduate Studies Committee, MSU Graduate Council, College of Engineering PhD Oversight Committee
Chair, Search Committee, Vice President for Administration and Finance, 1999
Chair, Search Committee, Provost, 2001
Chair, Search Committee, Vice Provost and Director of Extension, 2003
Chair, MSU Graduate Council, 1999-2005
Chair Agricultural Animal Care and Use Committee (AACUC), 2003 - 2005
Chair, Graduate Dean=s Council, Center for Learning and Teaching in the West (CLTW) Consortium, 2002 – 2004

Vice-Chair, Council of Graduate Deans, Inland Northwest Research Alliance (INRA), 2001-2004

Consulting:

Development Technology Corporation, Bozeman, MT, - February to July 1972

Infosystems, Bozeman, MT - March to June 1972

La Jolla Technology Inc., La Jolla, CA - January 1983 to 1985

Scientific Materials Inc. Bozeman, MT, 1995

Finnegan, Henderson, Farabow, Garrett & Dunner, Washington, DC - July 1983 to December 1983 and March 1985 to October 1986, Life Resonances Inc. - 1987 to Present

IatroMed Inc., Phoenix, AZ - April 1989 to April 1990

Expert Witness on Electromagnetic Fields in several trials involving human exposure to ELF fields

Fields of Specialization:

Electromagnetic Field Theory

Microwave Interaction in Solids

Microwave Component and Systems Design

Electromagnetic Fields in Biological Materials

Professional and Honorary Organizations:

Sigma Tau, Eta Kappa Nu, Kappa Mu Epsilon, Sigma Xi

Vice President MSU Chapter of Sigma Xi, 1979-1980

President MSU Chapter of Sigma Xi, 1980-81

Institute of Electrical & Electronic Engineers (IEEE), Senior Member; Montana Section Chairman, 1983-84

Bioelectromagnetics Society (BEMS), Program Committee 1993

Bioelectrical Repair and Growth Society (B.R.A.G.S.)

(a) Elected to Program Committee 1985

(b) Program Committee Chairman 1988, 1989, 1990

(c) Elected to BRAGS Council 1986. Served through 1988

President-Elect Bioelectrical Repair and Growth Society 1990

President, BRAGS, 1991, Past President, 1992

Director, BEMS, 2000-2003, President Elect, BEMS, 2003-4, President 2004-5, Immediate Past President, 2005-2006

Chair, BEMS Technical Program Committee, 2005-2006

BEMS Technical Program Committee Member, 2007-

American Association for the Advancement of Science

Reviewer for: *Journal of Electro-and Magnetobiology*, *Bioelectromagnetics*, *Journal of Orthopaedics and Related Research*, Wiley Publishing Company, Prentice-Hall Publishing

Awards and Honors:

The MSU EE Department David C. Uhrich Memorial Teacher of the Year Award, 1979-80
MSU Electrical Engineering Department Researcher of the Year, 1983-84
EE Department Teacher of the Year, 1985-86
Montana State University 1988 Wiley Faculty Award for Meritorious Research
Sigma Xi Award for Outstanding Research by a MSU Faculty Member, 1991
Chamber of Commerce Award for Excellence in Teaching 1984, 1992, 1996
The President=s Distinguished Teaching Award, MSU, 1996
Invited Speaker at Gordon Conference on:
 Bioelectrochemistry C 1984
 Bioelectrochemistry C 1986
 Gravitational Effects in Materials & Separation Processes - 1987
 Bioelectrochemistry C 1988
Invited Speaker at NATO Advanced Science Workshop, Erice, Italy, 1984
Invited Speaker at Emerging Electromagnetic Medical Technology Conference, Tulsa, OK,
 1989
Invited Speaker at the Robert C. Strom Foundation Seminar on "Electromagnetic Fields,
Science, Medicine and Public Health", Seattle, WA, November 8, 1990
Invited Speaker at FASEB meeting in Atlanta, GA, April 21-25, 1991, in Symposia on
"Recent Advances in Understanding Electromagnetic Energy Interactions with Biological
Systems", paper entitled: "Cells in Transition: Sensitivity to ELF Fields".
Invited speaker at American Society for Microbiology Conference on Micorbial Biofilms,
Snowbird, Utah, September 30-October 4, 1996
Invited speaker at American Society for Microbiology Conference ABiofilms 2000", Big
Sky, Montana, July 16-20, 2000.
Invited speaker to faculty at Allegheny General Hospital, Center for Genomic Sciences,
September 7, 2000.
Invited speaker at the American Society for Microbiology, Medical Biofilms Conference,
Tokyo, Japan, March 17-10, 2002
Invited to be co-presenter of the Workshop on Distance Learning, Council of Graduate
Schools, Summer meeting for new graduate deans, 2004

Patents:

Twenty eight (28) domestic and eleven (11) foreign patents in the area of electromagnetic fields interacting with biological systems.

Articles Published in Refereed Journals and Books:

McLeod, B.R., 1965, Current Oscillations in Cadmium Sulfide. Proceedings, IEEE 53:1722.

McLeod, B.R., 1968, A. Waveguide Isolator Using InSb. IEEE Transactions on Microwave Theory and Technique. MTTC 16:877.

McLeod, B.R., 1971. A-35 GHz Isolator Using a Coaxial Solid-State Plasma in a Longitudinal Magnetic Field. IEEE Transactions on Microwave Theory and Techniques. MTTC19:510.

McLeod, B.R., 1976. A Direct Fuel Moisture Measuring Instrument: An Aid for Scheduling Prescribed Fires. Proceedings, Tall Timbers Fire Ecology Conference No. 14 and Intermountain Fire Research Council Fire and Land Management Symposium. pp. 609-626.

McLeod, B.R., 1976. An Instrument for Observing Real-Time Changes in Moisture Content of Forest Fuels. *J. Microwave Power* 11:355-361.

McLeod, B.R., Pilla, A.A. and Sechaud, P., 1982. Electrochemical and Electrical Aspects of Low Frequency Electromagnetic Current Induction in Biological Systems. *J. Biological Physics* 11:51-58.

McLeod, B.R., 1983. Electromagnetic Fields Induced by Helmholtz Aiding Coils Inside Saline Filled Boundaries. *Bioelectromagnetics* 4:357-370.

McLeod, B.R. and Parker, R., 1984. Calculated Induced Currents in a Model Non-Union Fracture Stimulated by Helmholtz Coils or Resistively Coupled Parallel Plates. *J. Bioelectricity* 3:41-56.

McLeod, B.R. and Parker, R., 1985. Electromagnetic Fields, Biological Systems and Their Connection in Electromagnetic Biostimulation. Reconstruction Surgery and Traumatology, Electric and Electromagnetic Stimulation of Bone Growth, ed: Th.J.G. van Rens, Vol. 19. Karger

McLeod, B.R. and Liboff, A.R., 1986. Dynamical Characteristics of Membrane Ions in Multi-Field Configurations at Low Frequencies. *Bioelectromagnetics* 7:177-189.

Liboff, A.R. and McLeod, B.R., 1987. Kinetics of Channelized Membrane Ions in Magnetic Fields. *Bioelectromagnetics* Vol. 9, #1, pp. 39-51.

McLeod, B.R., Smith, S.D. and Liboff, A.R., 1987. Ion Cyclotron Resonance Frequencies Enhance Ca^{++} Dependent Motility in Diatoms. *J. Bioelectricity*, 6, #1, p. 1-12.

Smith, S.D., McLeod, B.R., Liboff, A.R., and Cooksey, K.E., 1987. Calcium Cyclotron Resonance and Diatom Motility. *Bioelectromagnetics*. Vol. 8, #3, p.215-227.

Rozek, R.J., M.L. Sherman, A.R. Liboff, B.R. McLeod, S.D. Smith, 1987. "Nifedipine is an Antagonist to cyclotron Resonance Enhancement of ^{45}Ca Incorporation in Human Lymphocytes", *Cell Calcium*, Vol. 8, pp. 413-427.

McLeod, B.R., Smith, S.D. and Liboff, A.R., 1987. Calcium and Potassium Cyclotron Resonance Curves and Harmonics in diatoms (*A. Coffeaeformis*). *J. Bioelectr.* 6, pp. 153-168.

McLeod, B.R., and Liboff, A.R., 1987. "Cyclotron Resonance in Cell Membranes; The Theory of the Mechanism: In Mechanistic Approaches to Interactions of Electromagnetic Fields with Living Systems, M. Blank & E. Findl, eds., Plenum Publishing Corp.

Liboff, A.R., Smith, S.D. and McLeod, B.R., 1987. "Experimental Evidence for Ion Cyclotron Resonance Mediation of Membrane Transport" in Mechanistic Approaches to Interactions of Electromagnetic Fields With Living Systems, M. Blank and E. Findl, eds., Plenum Publishing Corp.

Liboff, A.R. and McLeod, B.R., 1988, "Channel Ion Helicity and Inverse Cyclotron Resonance Eigenfrequencies", *Biophysical J.* 53, 632a.

McLeod, B.R., Liboff, A.R., and Smith, S.D., 1989, Rotating Magnetic Fields and Ion Cyclotron Resonance, *J. Bioelectricity*, 8:119-125.

McLeod, B.R., 1990, "Low Frequency Electromagnetic Energy; Its Emergence as a Medical Treatment:", Emerging Electromagnetic Medicine, Eds: M.E. O'Connor, R.H.C. Bentall, and J.C. Monahan, Springer-Verlag, New York.

Liboff, A.R., McLeod, B.R. and Smith, S.D., 1990, "Ion Cyclotron Resonance Effects of ELF Fields in Biological Systems", Extremely Low Frequency Electromagnetic Fields: The Question of Cancer, Eds: Bary W. Wilson, Richard G. Stevens, and Larry E. Anderson, Battelle Press, 505 King Ave., Columbus, OH 43201, pp. 251-290.

Smith, S.D., Liboff, A.R., and McLeod, B.R., 1995. "Effects of Magnetic Fields on Living Systems", in BIOELECTROCHEMISTRY; PRINCIPLES AND PRACTICE, VOL 2, Bioelectrochemistry of Cells and Tissues. Walz, D., Berg, H., and Milazzo, G., Eds., Birkhauser, Basel, pp 245-282.

Smith, S.D., McLeod, B.R., and Liboff, A.R., 1991, "Effects of Resonant Magnetic Fields on Chick Femoral Development *In Vitro*", *Journal of Bioelectricity* (10), #1and 2, 81-100.

McLeod, B.R., Liboff, A.R., and Smith, S.D., 1992. "Biological Systems in Transition: Sensitivity to ELF Fields", *Electro- and Magnetobiology*, (11) #1, 29-42.

Jones, D. and McLeod, B.R., 1991. "Electromagnetic Cell Stimulation", in Electrical Manipulation of Cells Ed. by P.T. Lynch and M.R. Davey, Chapman Hall, New York and London.

Liboff, A.R., McLeod, B.R., and Smith, S.D., 1991. "Resonance Transport in Membranes", in Electromagnetics in Medicine and Biology, Eds. C.T. Brighton and S.R. Pollack, San Francisco Press, Inc., Box 6800, San Francisco, CA 94101-6800.

Magee, F.P., Weinstein, A.M., Fitzsimmons, R.J., Baylink, D.J., and McLeod, B.R., 1991. "The Use of Low-Energy Combined ac and dc Magnetic Fields in the Prevention of Osteopenia", in Electromagnetics in Medicine and Biology, Eds. C.T. Brighton and S.R. Pollack, San Francisco Press Inc., Box 6800, San Francisco, CA 94101-6800.

McLeod, B.R., Liboff, A.R., and Smith, S.D., 1991. "The State of Cell Equilibrium: One Key to Cell/ELF Interaction", in Electromagnetics in Medicine and Biology, Eds. C.T. Brighton and S.R. Pollack, San Francisco Press Inc., Box 6899, San Francisco, CA 94101-6800.

Grande, D.A., Magee, F.P., Weinstein, A.M., and McLeod, B.R., 1991. "The Effect of Low-Energy Combined ac and dc Magnetic Fields on Articular Cartilage Metabolism", in Electromagnetics in Medicine and Biology, Eds. C.T. Brighton and S.R. Pollack, San Francisco Press Inc., Box 6899, San Francisco, CA 94101-6800.

McLeod, B.R., Liboff, A.R., and Smith, S.D., 1992, "Electromagnetic Gating in Ion Channels", *Journal of Theoretical Biology*, (158), 15-31.

Deibert, M.C., McLeod, B.R., and Liboff, A.R., (1994), "Ion Resonance Electromagnetic Field Stimulation of Fracture Healing in Rabbits With a Fibular Osteotomy", *Journal of Orthopaedic Research*, 12, No. 6., p. 878

Smith, S.D., McLeod, B.R., and Liboff, A.R., (1995), "Effects of CR-tuned 60 Hz Magnetic Fields on Sprouting and Early Growth of *Raphanus Sativus*", *Bioelectrochem and Bioenerg.* 32:67-76.

Smith, S.D., McLeod, B.R., and Liboff, A.R., (1995), "Testing the Ion Cyclotron Resonance Theory of Electromagnetic Field Interaction with Odd and Even Harmonic Tuning for Cations", *Bioelectrochem. And Bioenerg.* 38:161-167

Liboff, A. R., and McLeod, B. R., (1995), "Power Lines and the Geomagnetic Field", *Bioelectromagnetics.* Vol. 16, p.227-230.

Wellman, N., Fortun S. M., and McLeod B. R., (1996) "Bacterial Biofilms and The Bioelectric Effect", *Antimicrobial Agents and Chemotherapy*, Vol. 40, No 9, Sept. 1996.

Stewart, P.S., Attanakaroon, L. Goodrum, S.M. Fortun, and **B.R. McLeod**, "Electrolytic Generation of Oxygen Partially Explains Electrical Enhancement of Tobramycin Efficacy Against *Pseudomonas aeruginosa* Biofilm," *Antimicro. Agents & Chemotherapy*, 43(2):292-296 (1999).

McLeod, B.R., S. Fortun, J.W. Costerton, and P.S. Stewart, "Enhanced Bacterial Biofilm Control Using Electromagnetic Fields in Combination with Antibiotics," In: Methods in ENZYMOLOGY, Biofilms, R.J. Doyle (Ed.), Academic Press, 310:656-670 (1999).

Invited Article: Hilderbrand, David and B. R. McLeod, A Model for Collaboration in Multi-Institutional Graduate Programs, Council of Graduate Schools *Communicator*, Vol XXXVI, No. 2, page 9 (March, 2003)

Abstracts Presented at National or International Meetings:

McLeod, B.R., Sampsel, M. and Pilla, A.A., 1982. "An Electromagnetic Fields Analysis of the Helmholtz Coil Delivery System for Biological Studies". Presented at The Electrochemistry for the Study and Control of Cell and Tissue Growth and Repair Symposium, The Electrochemical Society, Montreal, Canada. Invited Paper.

McLeod, B.R., and Siskin, B.F., 1982. "The Effect of Orientation of Helmholtz Coils on Neurite Growth of Nerve Ganglia in Vitro." Second Annual Meeting of the Bioelectrical Repair and Growth Society (BRAGS), Oxford, England.

McLeod, B.R., Pilla, A.A., and Sampsel, M.W., 1982. "Helmholz Coil-Cell System Spatial Relationship and Electrical Dosage in the Electromagnetic Modulation of Tissue Growth and Repair". Second Annual Meeting of the Bioelectrical Repair and Growth Society, Oxford, England.

McLeod, B.R., Siskin, B.F., Estes, S., and Kryscio, R., 1983. "Neuronal Regeneration Stimulated by Pulsed Electromagnetic Fields". Fifth Annual Meeting of the Bioelectromagnetics Society, Boulder, CO.

McLeod, B.R., 1983. "Electromagnetic Fields Induced in Selected Bounded Regions by Helmholtz Aiding Coils". Fifth Annual Meeting of the Bioelectromagnetics Society, Boulder, Co.

McLeod, B.R., 1983. "Electromagnetic Signal Analysis Applied to Controlling Cell Functions Electrically", presented at: The Ions and Electrochemical Control of Cell Functions Symposium, The Electrochemical Society, San Francisco, CA. Invited Paper.

McLeod, B.R., and Liboff, A.R., 1985. "Dynamics of Biological Ions in Low-Frequency Multi-Field Configurations". Seventh Annual Meeting of the Bioelectromagnetics Society, San Francisco, CA.

McLeod, B.R., 1985. "Experimental Measurements and Theoretical Calculations on a Simulated Bone-Flesh Model". Seventh Annual Meeting of the Bioelectromagnetics Society, San Francisco, CA. Invited Paper.

McLeod, B.R., and Liboff, A.R., 1985. "Electromagnetically Induced Osteogenesis: Cyclotron Resonance as a Testable Hypothesis". Fifth Annual Meeting of the Bioelectrical Repair and Growth Society (BRAGS), Boston, MA.

McLeod, B.R., and McLeod, R.R., 1985. "An Estimation of the Damping Factor for Biological Ions in Low Frequency EM Fields". Eighth Annual Meeting of the Bioelectromagnetics Society, Madison, WI.

McLeod, B.R., Smith, S.D., Liboff, A.R., and Cooksey, K.E., 1986. "Marine Diatoms and ELF Cyclotron Resonance". Eighth Annual Meeting of the Bioelectromagnetics Society, Madison, WI.

McLeod, B.R., Smith, S.D., Liboff, A.R., and Cooksey, K.E., 1986. "A Successful Biological Test of the Cyclotron Resonance Theory". Sixth Annual Meeting of the Bioelectric Repair and Growth Society, Utrecht, Holland.

Smith, S.D., McLeod, B.R., Liboff, A.R., and Cooksey, 1987. "Harmonic Response Patterns of Biosystems Exposed to Weak EM Fields". Ninth Annual Meeting of the Bioelectromagnetics Society, Portland, OR, June 21-25.

Winters, W.D., Liboff, A.R., and McLeod, B.R., 1987. "Enhancement and Inhibition of Protein Synthesis in Human Chondrosarcoma Cells Exposed to 60 Hz Magnetic Fields". Abstracts, 7th Annual Meeting, Bioelectrical Repair and Growth Soc.: 86.

Liboff, A.R., and McLeod, B.R., 1987. "Cyclotron Resonance Eigenfrequencies and Ion Channel Periodicity", IEEE Engineering in Medicine and Biology Soc. 9th Annual Conference, Boston.

Liboff, A.R., Rozek, R.J., Sherman, M.L., McLeod, B.R., Smith, S.D., 1987. "Incorporation of Calcium in Human Lymphocytes is Maximized Following Cyclotron Resonance Exposure", Seventh Annual Meeting of the Bioelectrical Repair & Growth Society, Toronto, Canada, 10/11-14.

Liboff, A.R., McLeod, B.R., 1988. "Cyclotron Resonance in Ion Channel Proteins with 3-Fold Cylindrical Symmetry", Tenth Annual Meeting of the Bioelectromagnetics Society, Stamford, CT, June 19-24.

Smith, S.D., McLeod, B.R., Liboff, A.R., 1988. "Cyclotron Resonance Control of Explanted Chick Femurs", Eighth Annual Meeting of the Bioelectrical Repair and Growth Society, Washington, D.C., October 9-12.

McLeod, B.R., Liboff, A.R., and Smith, S.D., 1989. "A Theoretical Model that Predicts Frequency, Amplitude and Harmonic Resonances in Cell Channels", Eleventh Annual Meeting of the Bioelectromagnetics Society, Tucson, AZ, June 18-22, paper E-4-3.

McLeod, B.R., Liboff, A.R., and Smith, S.D., 1989. "A Mathematical Model Incorporating Membrane Channel Parameters that Exhibits Frequency, Amplitude and Harmonic Windows", Ninth Annual Meeting of the Bioelectrical Repair & Growth Society, Cleveland, OH, September 17-20, paper 51.

McLeod, B.R., Liboff, A.R., and Smith, S.D., 1990. "A Cell Channel Model Suggested by Data Linking Biological Systems and ELF Fields", Twelfth Annual Meeting of the Bioelectromagnetics Society, San Antonio, TX, June 10-14, paper 0-1-5.

McLeod, B.R., Liboff, A.R., and Smith, S.D., 1990. "The State of Cell Equilibrium; A Key to Cell, ELF Interaction", Transactions of the Tenth Annual Meeting of the Bioelectrical Repair & Growth Society, Philadelphia, PA, October 14-17, p. 29.

Grande, D.A., Magee, F.P., Weinstein, A.M., and McLeod, B.R., 1990, "The effect of Ion-Specific Magnetic Fields on Resting Articular Cartilage Metabolism", Transactions of the Tenth Annual Meeting of the Bioelectrical Repair & Growth Society, Philadelphia, PA, October 14-17, p. 22.

McLeod, B.R., Smith, S.D., and Liboff, A.R., 1991. "Timing and Biosystem Changes; Two Important Parameters in Modeling ELF Interactions With Living Systems", Transactions of the Eleventh Annual Meeting of the Bioelectrical Repair & Growth Society, Scottsdale, AZ, September 29, October 2, p.1.

McLeod, B.R., Liboff, A.R., Smith, S.D., and Mohr, T.A., 1991. "Selecting a System to Evaluate a Model Describing ELF/Biological System Interactions", Transactions of the Eleventh Annual Meeting of the Bioelectrical Repair and Growth Society, Scottsdale, AZ, September 29, October 2, p.3.

Smith, S.D., Liboff, A.R., and McLeod, B.R., 1991. "Effects of ELF Magnetic Resonant fields on Murine Neuroblastoma Proliferation and Differentiation", Transactions of the Eleventh Annual Meeting of the Bioelectrical Repair and Growth Society, Scottsdale, AZ September 29, October 2, p.30.

Liboff, A.R., Jenrow, K.A., Smith, S.D., and McLeod, B.R., 1991. "Human Lymphoma in Vitro Proliferation Increases Following K^+ -Cyclotron Resonance Magnetic Exposure", Transactions of the Eleventh Annual Meeting of the Bioelectrical repair and Growth Society, Scottsdale, AZ, September 29, October 2, p.49.

Mohr, T.A., and McLeod, B.R., 1991. "Growth of Plants Exposed to Magnetic Fields tuned to Calcium Cyclotron Resonance Conditions", Transactions of the Thirteenth Annual Meeting of the Bioelectromagnetics Society, Salt Lake City, UT, June 23-27, paper H-1-3.

Liboff A. R., Jenrow, K. A., and McLeod, B. R., 1992. "ELF-Induced Proliferatin at 511 MG in HSB-2 Cell Culture as a Function of 60 Hz Field Intensity", The First World Congress for Electricity and Magnetism in Biology and Medicine, Buena Vista Palace, Lake Buena Vista, Florida, June 14-19, Abstract Book, Paper # R-5, p. 55

McLeod, B. R., Rogers, S. J., and Kosted, P. J., (1993), "The Use of Genetically Engineered Bacteria as A Universal Test System For Testing ELF, Biological System Interactions", Proceedings of the Fifteenth Annual Meeting, The Bioelectromagnetics Society, June 13,17, 1993, Los Angeles, CA, Paper F-1-2, p. 71.

McLeod, B. R., Rogers, S. J., and Kosted P. J., (1993), "Modifying the Classical Ames Test for ELF Experiments", Transactions of the Bioelectrical Repair and Growth Society, V-XIII, Thirteenth Annual Meeting, Dana Point, CA, October 10-13, 1993, p. 32.

Smith S. D., McLeod, B. R., and Liboff, A. R., (1993), "Effects of Ion-Specific Tuned Fields on Radish Growth", Transactions of the Bioelectrical Repair and Growth Society, V-XIII, Thirteenth Annual Meeting, Dana Point, CA, October 10-13, 1993, p. 40.

Jones, D., and McLeod, B. R., (1993), "Electric Fields, Pulsed Electromagnetic Fields and Static Magnetic Fields- How and Why Are They Biologically Active?", Proceeding of the 1st International Conference on Cellular Engineering, 12-15 September 1993, "The Potteries", United Kingdom, p. 109

McLeod, R. R., and Liboff, A. R., (1993), "The Measurement and Data Analysis of DC and AC Magnetic Fields Generated by Long Conducting Wires", The Annual Review of Research on Biological Effects of Electric and Mangepic Fields From The Generation, Delivery & Use of Electricity, Savannah, Georgia, October 31-November 3, 1993, p 50-52.

Liboff, A. R., and McLeod, B. R., (1993), "Incorporation of the Geomagnetic Field Into 50/60 HZ Power Line Epidemiological Studies", The Annual Review of Research on Biological Effects of

Electric and Magnetic Fields From The Generation, Delivery & Use of Electricity, Savannah, Georgia, October 31-November 3, 1993, p 107-108.

Smith, S. D., McLeod, B.R., and Liboff, A.R., (1994), AA Critical Test of the ICR Theory Using Radish Seedling Growth@, Society for Physical Regulation in Biology and Medicine, Annual Meeting Abstracts, October 13-16, 1994.

McLeod, B.R., Rogers, S.J., and Kosted P.J., (1994), "Parallel AC and DC Magnetic Fields Alter the SOS Response of *E. coli* ", Proceedings of the Sixteenth Annual Meeting, The Bioelectromagnetics Society, Copenhagen, Denmark, June 12-17, paper H-3-7.

Kosted P.J., McLeod B.R., and Rogers, S.J., (1995), "Calcium Resonance Fields Increase Stress in Ames' Reversion Assay and GE94 *E. coli* SOS Response" Proceedings of the Seventeenth Annual Meeting, The Bioelectromagnetics Society, Boston, MA., June 18-22, paper 1-8.

McLeod, B. R., and Fortun, S. M., (1996), AThe DC Bioelectric Effect: Evidence of a Dose Response in EM Field Enhancement of Bacterial Biofilm Control@ Proceedings of the Eighteenth Annual Meeting, The Bioelectromagnetics Society, Victoria, B.C., Canada, June 9-14, Paper A-8-5, p. 33.

McLeod, B.R., Stewart P.S., Fortun, S. M., (1996) AControl of Biofilms by the Bioelectric Effect@, The American Society for Microbiology, Conference on Microbial Biofilms, Abstracts, Snowbird, Utah, September 30, October 4, p. 10.

McLeod, B. R., (2000), AElectromagnetic Fields and Their Use in Biofilm Control@, The American Society for Microbiology, Biofilms 2000 Conference Abstracts, Big Sky, Montana, July 16-20, 2000

McLeod, B.R., (2000), AElectromagnetic Fields and Their Use in Biofilm Control@, Invited Special Lecture to the faculty, Allegheny General Hospital, Center for Genomic Sciences, Pittsburg, PA, Sept. 7, 2000.

McLeod, B.R., J.W. Costerton (2001), AElectromagnetic Fields Used for Biofilm Control@, Proceedings of the Twenty-Third Annual Meeting, The Bioelectromagnetics Society, St. Paul, Minn., June 10-14, 2001, p. 23

McLeod, B.R., (2002), AElectromagnetic Fields Applied to Biological Cells; A New Potential for Controlling Persistent Infections@, Proceedings, Medical Biofilms 2002, Tokyo, Japan, (Invited Paper), March 17-19, 2002, p. 22

Recent Grants

1. P. S. Stewart P.I., B. R. McLeod, Co-PI, Murdock Charitable Trust, AControl of Peridontal Disease Using the Bioelectric Effect@, 2/01/97 to 01/31/99, Amount of Grant.....\$84,000

2. B. R. McLeod, Steril-Safe Inc., AA Test to Evaluate the Design of a Sterilization Box@, 5/15/97 to 12/30/97\$15,000
3. B. R. McLeod, Sulzer Carbonedics, Inc., ABacteria Control in Porcine Heart Valves Using DC Current@, 9/15/97 to 2/15/98,\$20,483
4. B. R. McLeod, Inland Northwest Research Alliance (INRA), ACGD Support@ 4/15/02 to 9/30/02\$46,831
5. B. R. McLeod, INRA, AGraduate Fellow Support@, 4/15/02 to 8/15/05\$175,000
6. B. R. McLeod, INRA, ASubsurface Science Elective Course Development, 5/28/02 to 12/31/02,\$58,715
7. B. R. McLeod, INRA, ARecruiting Coordinator@, 12/15/02 to 2/28/03.\$13,717
8. B. R. McLeod, MSU, College of Engineering Dean's Office, 9/1/05 to 5/15/07,\$141,300
9. B. R. McLeod, Peter Ewing, Graduate Student Fellowship 1/1/07 to 1/1/08.....\$25,000
10. B. R. McLeod, Allegheny-Singer Research Institute, 9/1/07 to 10/1/08.....\$41,073