

Curriculum Vitae
MIHAI R. GHERASE
Assistant Professor of Physics

Department of Physics, California State University, Fresno
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EDUCATION **2001 – 2006** Ph.D. in Physics, Medical Physics area, Carleton University, Ottawa, ON, Canada.
 1999 – 2001 M.Sc. in Medical Physics, University of Bucharest, Romania.
 1995 – 1999 B.Sc. in Physics, University of Bucharest, Romania.

CITIZENSHIP Canadian and Romanian; permanent resident status of the United States.

AWARDS **1995 – 1999** Undergraduate scholarships, University of Bucharest.
 2001 – 2006 Graduate scholarships, Carleton University.
 2017 Outstanding Reviewer Award from the Institute of Physics Publishing for *Physiological Measurement* journal.

PROFESSIONAL SOCIETIES American Association of Physicists in Medicine (AAPM)
 American Physical Society (APS)
 Health Physics Society (HPS)

RESEARCH

2014 – 2019

Assistant Professor of Physics in the Department of Physics at the California State University, Fresno.

Research projects:

- Established a microbeam x-ray fluorescence laboratory (XRF) using the \$95,000 research start-up fund. The lab consisting of: (1) stainless steel shield box sitting on an optical table, (2) an integrated x-ray tube and x-ray lens unit capable of producing an intense x-ray beam with a 20 μm focal spot at 4 mm focal distance, (3) silicon-drift x-ray detector, (4) automated XYZ piezoelectric positioning stage coupled with a manual mini rotational stage for scanning XRF microscopy studies.
- Measurements of the x-ray beam size as a function of the photon energy were performed using two methods: (i) scanning x-ray fluorescence, and (ii) knife-edge. The results and comparison were summarized and discussed in a publication in the journal *Nuclear Instruments and Methods in Physics Research B*.
- Experimental work at the Canadian Light Source in Saskatoon, Canada, December 14-19, 2015. The experiments were concerned with the lead detection in bare bone and bone with overlying soft tissue phantoms using L-shell x-ray fluorescence. The aim was to find optimal excitation photon energy and excitation-detection geometry. The experimental results and analysis led to a first-authored paper published in the *X-ray Spectrometry* journal on May 31, 2017.
- Two additional x-ray beam energy-dependent measurements: angular divergence and focal distance were included in a poster presentation at the 2015 Annual Meeting of the Far West Section of the American Physical Society, October 29-31, 2015, Long Beach, CA.
- Initial results of the lead (Pb) in bone phantoms with the microbeam XRF system presented at the
- Co-author of research paper “Detection of lead in bone phantoms and arsenic in soft tissue phantoms using synchrotron radiation and a portable x-ray fluorescence system” accepted for publication in the *Physiological Measurement* journal on January 30, 2017.
- Lead measurements in bare bone and bone and soft tissue phantoms using the microbeam XRF system. The results were presented in a scientific poster with student co-author at the 2016 Annual Meeting of the Health Physics Society, Spokane, WA, July 17-21, 2016.
- Experimental optimization of arsenic XRF detection in skin phantoms. The results were presented at the 2016 Annual Meeting of the Far West Section of the American Physical Society at the University of California, Davis, Davis, CA, October 28-29, 2016.

- Grazing-incidence x-ray fluorescence approach was developed to measure lead detection limits in plaster-of-Paris bone and polyoxymethylene (POM) soft tissue phantoms. The development of the method led to three poster and oral presentations at local and national scientific conferences with two students and an article with student co-author (Summer Al-Hamdani) published in the *Physiological Measurement* journal on March 29, 2018.
- The optimal grazing incidence position (OGIP) approach was improved to increase the sensitivity of lead detection via L-shell x-ray fluorescence in plaster-of-Paris bone and polyoxymethylene (POM) soft tissue phantoms. The reproducibility of the new method was also assessed. Initial results were presented in a poster presentation with student co-author (Summer Al-Hamdani) at the Central California Research Symposium in Fresno on April 25, 2018 and the final results were published in the *Biomedical Physics and Engineering* journal on October 22, 2018.
- Principal Investigator (PI) of a research proposal titled “X-ray fluorescence measurements of the microscopic spatial distributions of the trace elemental concentrations in a bovine bone slice.” The proposal received 40 hours of beam time at the Canadian Light Source (CLS). Due to multiple equipment failures and extended repair time, CLS was not open for research for more than half of year. I recently acquired data during a 48-hour long time (additional 8 hours to acquire long XRF maps at different photon energies) at the Very Sensitive Elemental and Structural Probe Employing Radiation (VESPERS) beamline from CLS during a trip in the period August 27-31, 2019. During the “down time” the research project has developed a new direction: an x-ray photon backscatter modelling to account for tissue heterogeneity to yield quantitative elemental concentrations in typical XRF microscopy studies involving synchrotron radiation. The research work was led by a graduate student Annette Lopez and led to two poster presentations.
- Radiation dosimetry measurements for the developed L-shell x-ray fluorescence bone lead measurements in plaster-of-Paris bone and polyoxymethylene (POM) soft tissue phantoms. The purchase of a commercial optically-stimulated luminescence (OSL) dosimetry system from Landauer, Inc. was initiated. Research began this summer and will continue this fall and in 2020 year. Current M.S. Physics candidate Sarah Kroeker participates in this research project.

Research awards and grants

- CSM Faculty Sponsored Student Research Award (FSSRA) (\$1,000.00) 2014/2015 (student **Andres Felipe Vargas**).
- CSM FSSRA (\$714.00) 2015/2016 (student **Andressa Freire-Gama**).
- CSM FSSRA (\$1000.00) 2016/2017 (student **Summer Al-Hamdani**).
- CSM Faculty Professional Development Award (\$1050) 2016/2017.
- CSM College Scholarly and Creative Activity Award 2016/2017 (3 WTU Fall 2016).
- Undergraduate Research Grant (\$900.00) 2016-2017 (student **Benjamin Avila**).
- CSM Faculty Professional Development Award (\$1,200) 2017/2018.
- SCORE SC2 research grant from the National Institute of General Medical Sciences (grant #1SC2GM121187-01) valued at \$420,000 for three years (09/01/2017-07/31/2020).
- CSM College Scholarly and Creative Activity Award 2017/2018 (3 WTU Fall 2017).
- CSM FSSRA (\$568.00) 2018/2019 (student **Annette Lopez**).

2006 – 2013

Postdoctoral Fellow in the XRF laboratory of Dr. David Fleming at Mount Allison University. Work involved three experimental setups: Si(Li) detector with a Cd-109 radioactive source as the excitation beam, a commercial XRF system which is based on a miniature field-emission tungsten x-ray tube and a silicon PiN diode detector, and a TLD reader Harshaw 3500 with dosimeter chips. Research work was mainly focused on *in vivo* detection of arsenic and selenium in the human body using XRF methods. Main research accomplishments include:

- Work at the Canadian Light Source in Saskatoon, Canada, October 5-10, 2012. The study focused on determining the chemical speciation of arsenic in human nails. The XANES (X-ray Absorption Near-Edge Spectroscopy) capabilities of the Hard X-ray Micro Analysis (HXMA) beamline was used.
- Research at the Canadian Light Source in Saskatoon, Canada, June 5-8, 2012. The study involved the measurements of the microscopic distribution of arsenic in human nails. The microbeam capabilities of the

HXMA beamline were used. The manuscript was published in the journal *Physiological Measurement* **34**:1163-1177 (2013).

- Study of x-ray fluorescence detection of arsenic and selenium in 300 human nail samples. The samples were collected from households in rural areas with known high concentration of arsenic in the consumed well-water. The calibration work was presented at the 8th International Topical Meeting on Industrial Radiation and Radioisotope Measurement Applications (IRRMA-8) which was held from 26 June-1 July 2011 in Kansas City, MO, US.
- Development of a calibration method for depth-dependent elemental concentration samples using layered calibration method. Publication: *Nuclear Instruments and Methods in Physics Research Section B* **269**:1150-1156 (2011).
- Work towards developing an XRF system based on a commercial miniature x-ray tube for *in vivo* measurements of arsenic in skin. Publications: (1) *Physics in Medicine and Biology* **52**: N459-465 (2007), (2) *Applied Radiation and Isotopes* **68**: 743-745 (2010).
- Dosimetry study of our portable x-ray spectrometer using thermoluminescent dosimeters (TLDs). Publication: *Physics in Medicine and Biology* **55**:5499-5514 (2010).
- Development of a human nail phantom designed to estimate detectability of arsenic and selenium using a portable x-ray spectrometer. Publication: *Physics in Medicine and Biology* **55**:N151-159 (2010).
- Derivation of an analytical model that can be used for the analysis of XRF spectra for samples presenting depth-dependent concentration. Publication: *Applied Radiation and Isotopes* **67**:50-54 (2009).
- Modelling work towards an optimal K_{α} XRF detection geometry of arsenic in skin using an extended Fundamental Parameter Method. Publication: *X-ray Spectrometry* **38**:513-518 (2009).
- Fundamental Parameter Method model to estimate arsenic concentration in skin phantoms from the experimental x-ray spectra. Publication: *X-ray spectrometry* **37**:482-489 (2008).
- Synchrotron work at the Canadian Light Source in November 2008. The project involved experiments towards validating a technique to measure arsenic concentrations for homogeneous and depth-dependent skin phantoms using synchrotron radiation. Publication: *The Activity Report of Canadian Light Source 2008*.
- Synchrotron Summer School at the Canadian Light Source facility. Visits of the facilities and lectures on various synchrotron research topics, Saskatoon, August 20-24, 2007.

2001 – 2006

Research Assistant in the hyperpolarized xenon (H-Xe) Magnetic Resonance Imaging (MRI) laboratory from Carleton University (now at Imaging Research Laboratories from the Robarts Research Institute in London, Ontario). The research project involved work with a custom-built hyperpolarized ^{129}Xe (H-Xe) system. Research accomplishments include:

- Experimental work towards the development of H-Xe dissolved in a perfluorooctyl bromide (PFOB) emulsion as a Magnetic Resonance contrast agent for cancer detection. Using a radial diffusive exchange model and dynamic acquisition of NMR spectra flow measurements were demonstrated in a phantom-type experiment.
- Experimental work comparing the NMR properties of H-Xe dissolved in PFOB and in alternative solvents (highly fluorinated sucrose polyesters) for potential applications. Publication: *Journal of Fluorine Chemistry* **125**:1457 (2004).
- Development of a radial two-compartment diffusive theoretical model which was used to analyze the diffusive exchange spectra of H-Xe dissolved in PFOB emulsion. Publication: *Journal of Chemical Physics* **125**:044906 (2006).

TEACHING

2014 – 2019

Assistant Professor of Physics

- (1) *Introduction to Magnetic Resonance Imaging and Spectroscopy* (upper-level undergraduate Medical Physics)
Topics: the basic physics of nuclear magnetic resonance (NMR) phenomenon, interaction of nuclear magnetic moments with static and rotating magnetic fields, longitudinal and transverse relaxation, the phenomenological Bloch equation, signal equation via reciprocity principle, imaging principles, k -space, selective excitation, basic imaging sequences.
Textbook: *Principles of Magnetic Resonance Imaging* by D. G. Nishimura, 1996, to be ordered online.

- (2) *Radiation Physics* (upper-level undergraduate Medical Physics)
 Topics: basics of atomic and nuclear physics, classification of radiation, interactions of charged particles with matter, interactions of x-ray photons with matter, kinetics of radioactive decay, modes of radioactive decay.
 Textbook: *Radiation Physics for Medical Physicists* by E.B. Podgoršak, Springer, 2-nd ed., 2010.
- (3) *Nuclear Medicine Physics* (upper-level undergraduate Medical Physics)
 Topics: radionuclides, radioactive decay, review of basic radiation interactions, instrumentation, Nuclear Medicine imaging modalities.
 Textbook: *Physics in Nuclear Medicine* by S. R. Cherry, J. A. Sorenson, and M. E. Phelps, Saunders, 4-th ed., 2012.
- (4) *Diagnostic X-ray Imaging Physics* (upper-level undergraduate Medical Physics)
 Topics: Fourier transforms, convolution, tomographic reconstruction principles, statistical distributions, x-ray production, x-ray imaging modalities.
 Textbook: *The Essential Physics of Medical Imaging* J.T. Bushberg et al., Lippincott Williams & Wilkins, 3-rd ed., 2012.
- (5) *Mechanics and Wave Motion* (introductory-level calculus-based undergraduate Physics lecture and lab sections)
 Topics: kinematics, dynamics, conservation of energy and momentum, collisions, rotational dynamics and kinematics, simple harmonic oscillations.
 Textbook: *Physics for Scientists and Engineers* by R.D. Knight, Pearson, 3-rd ed., 2013.
- (6) *Light and Modern Physics* (introductory-level calculus-based undergraduate Physics lecture)
 Topics: Maxwell's equations, electromagnetic waves, reflection and refraction of light, geometrical optics and its applications, wave optics, polarization of light, Einstein's special relativity, Bohr's model, photoelectric effect, Compton effect, basic concepts of quantum mechanics as applied to atoms, molecules, and solids.
 Textbook: *Physics for Scientists and Engineers with Modern Physics* by R. A. Serway and J. W. Jewett Jr., Cengage Learning, 9-th ed., 2016.

2008 – 2014

Postdoctoral Fellow and Lecturer

- (1) *General Physics II* (introductory-level calculus-based Physics)
 Responsibilities: 6h lecture & supervising in-class activities, preparation of assignments using *Mastering Physics* software, preparing assignments' solutions, preparing and marking two midterm and final exams.
 Topics: Newtonian gravitation, rotational motion, static equilibrium, simple harmonic motion, electric and magnetic fields, special relativity, and cosmology.
- (2) *Statistical Mechanics* (upper-level undergraduate Physics)
 Responsibilities: 3h lecture, preparation and marking of assignments, midterm and final exams.
 Topics: statistical definition of the entropy and temperature, Boltzmann distribution, thermal radiation and Planck distribution, chemical potential and Gibbs distribution, ideal gas, Fermi and Bose gases, Maxwell distribution.
 Textbooks:
 - *Thermal physics* by C. Kittel & H. Kroemer, Freeman, 2nd ed., NY, 2003.
 - *Introductory statistical mechanics* by R. Bowley & M. Sanchez, Clarendon Press, 2-nd ed., Oxford, 1999.
- (3) *Data Acquisition and Analysis* (intermediate-level undergraduate Physics)
 Responsibilities: lab manual preparation, 3h lecture, 3h lab, preparation and marking of assignments, midterm and final exams.
 Topics: random and systematic uncertainties, Gauss and Poisson distributions, correlation coefficients, fitting methods, chi-squared test, Monte Carlo methods.
 Textbook: *An introduction to error analysis* by J.R. Taylor, University Science Books, 2nd ed., Sausalito, 1997.
- (4) *Methods of Mathematical Physics* (upper-level undergraduate Mathematics and Physics course)
 Responsibilities: 3h lecture, 3h lab, preparation of assignments, midterm and final exams.
 Topics: linear algebra, vector calculus, Fourier transforms.
 Textbooks:
 - *Essential Mathematical Methods for the Physical Sciences* by K.F. Riley & M.P. Hobson, Cambridge University Press, 1-st ed., Cambridge, 2011.
 - *Mathematical Methods for Physicists* by G.B. Arfken & H.J. Weber, 6-th ed., Academic Press, San Diego, 2005.

- *Mathematical Methods for Physicists* by H.J. Weber & G.B. Arfken, 5-th ed., Academic Press, San Diego, 2004.

(5) *Medical Physics* (upper-level undergraduate Physics)

Responsibilities: Guest lecturer for the Magnetic Resonance Imaging (MRI) portion.

(6) *Physics of the Living Body* (introductory-level undergraduate Physics)

Responsibilities: lab preparation, supervision and marking assignments.

2001 – 2006

Teaching Assistant – Introductory-level Physics lab instruction within the Physics Department at Carleton University for 10 semesters. Responsibilities: lab supervision, problem solving sessions, marking assignments, lab reports, lab exams, and written tests.

RESEARCH SUPERVISION

Assistant Professor at California State University, Fresno – research supervision of the following students:

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| (1) Andres Felipe Vargas (2015) | B.S. Biomedical Physics and Computer Science |
| (2) Andressa Freire-Gama (2016) | B.S. Biomedical Physics – exchange student from Brazil |
| (3) Benjamin Avila (2016-2017) | B.S. Biomedical Physics |
| (4) Danielle Tanielian (2016-2017) | B.S. Biomedical Physics |
| (5) Summer Al-Hamdani (2016-2018) | B.S. Biomedical Physics and Mathematics |
| (6) Joshua Jardenil (2018-current) | B.S. Biomedical Physics |
| (7) Annette Lopez (2018-2019) | M.S. Physics |
| (8) Alex Lawson (2018-current) | B.S. Biomedical Physics |
| (9) Sarah Kroecker (2019-current) | M.S. Physics |

Postdoctoral Fellow – research co-supervision with Dr. David Fleming of the following students:

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| (1) Marc Vallee (2007-2008) | M.S. Medical Physics, McMaster University, Hamilton, ON, Canada. |
| (2) Isadel Eddy (2007-2008) | High-school teacher, Massachusetts. |
| (3) Chris Roy (2009-2010) | Ph.D. Medical Biophysics, University of Toronto, Toronto, ON, Canada. |
| (4) Joanna Mader (2009-2010) | Ph.D. Medical Physics, Dalhousie University, Halifax, NS, Canada. |
| (5) Kevin Alexander (2009-2011) | Ph.D. Medical Physics, Queen’s University, ON, Canada. |
| (6) Sarah Thomas (2011-2012) | M.S. Community & Regional Planning, University of British Columbia, BC, Canada. |
| (7) John Groves (2012-2013) | M.S. Mechanical Engineering, University of Guelph, ON, Canada. |

COMPUTATIONAL SKILLS

- C++ programming language: numerical algorithms and codes for research projects.
- *Origin* data analysis software: nonlinear curve fitting, data analysis, and plotting.
- *Microsoft Office* package: text editing, data analysis, and presentation.
- Operating systems: *Microsoft Windows* and *UNIX*.

PROFESSIONAL INVOLVEMENT & DEVELOPMENT

- Judge for the Senior Division of the 66th Annual Central California Science, Mathematics, and Engineering Fair, March 11, 2019, held at the Fairgrounds in Fresno, CA.
- Judge for the Senior Division for the 65th Annual Central California Science, Mathematics, and Engineering Fair, March 12, 2018, held at the Fairgrounds in Fresno, CA.
- Judge for the Senior Division for the 64th Annual Central California Science, Mathematics, and Engineering Fair, March 13, 2017, held at the Fairgrounds in Fresno, CA.
- Participant at the Physics and Astronomy New Faculty Teaching Workshop organized by the American Association of Physics Teachers (AAPT) and held June 20-23, 2016 at the American Center for Physics in College Park, MD.
- Joined the Faculty Online Learning Communities (FOLC) an online support group initiated by Dr. Andy Rundquist from Hamelin University in St. Paul, MN. The group was aimed at supporting new Physics faculty in their practical implementation of effective teaching practices through bi-monthly online meetings.

- Judge for the Senior Division for the 63rd Annual Central California Science, Mathematics, and Engineering Fair, March 8, 2016, held at the Fairgrounds in Fresno, CA.
- External reviewer for the following journals: (1) *Applied Radiation and Isotopes*, (2) *Physiological Measurement*, (3) *Spectroscopy Letters*, (4) *Food Analytical Methods*.
- Judge at the Canada-Wide Science Fair, May 17, 2012, held in Charlottetown, Prince Edward Island, Canada.
- Co-author of the textbook *Physics for Scientists and Engineers: An Interactive Approach Solutions* which accompanies the textbook published by Nelson Education Ltd. in 2013.

PRESENTATIONS

- (1) **J. Jardenil** and **M.R. Gherase**, “Detection limits of L-shell XRF measurements of Pb in bone and soft tissue phantoms using an optimal grazing incidence position method”, Annual Scientific Meeting of the American Physical Society (APS) Far West Section, Stanford University, Palo Alto, CA, November 1, 2019.
- (2) **A. Lawson**, **A. Lopez**, and **M.R. Gherase**, “Calculations of elemental concentrations in a lamb bone using optimal grazing-incidence position x-ray fluorescence (XRF) measurements”, Annual Scientific Meeting of the American Physical Society (APS) Far West Section, Stanford University, Palo Alto, CA, November 1, 2019.
- (3) **S. Kroeker** “Calculations of the radiation dose in optically stimulated luminescence (OSL) dosimeters irradiated by a microbeam”, Annual Scientific Meeting of the American Physical Society (APS) Far West Section, Stanford University, Palo Alto, CA, November 2, 2019.
- (4) **M.R. Gherase**, “L-shell X-ray Fluorescence Detection of Lead in Bone and Soft Tissue Phantoms Using a Microbeam and a Grazing-Incidence Method”, talk in the Topical Group on Medical Physics (GMED) sponsored session titled Physics in medicine: devices, algorithms, and models, April Meeting of the American Physical Society (APS), Denver, CO, April 14, 2019.
- (5) **A. Lopez** and **M.R. Gherase**, “X-ray backscatter modelling for quantitative x-ray fluorescence microscopy studies”, Health Physics Society (HPS) Midyear Meeting, San Diego, CA, February 18, 2019.
- (6) **A. Lopez** and **M.R. Gherase**, “X-ray backscatter modelling for quantitative x-ray fluorescence microscopy studies”, Annual Scientific Meeting of the American Physical Society (APS) Far West Section, California State University Fullerton, CA, October 20, 2018.
- (7) **A. Lawson** and **M.R. Gherase**, “An optimal grazing-incidence position (OGIP) method for arsenic measurement in polyester resin skin phantoms”, Annual Scientific Meeting of the American Physical Society (APS) Far West Section, California State University Fullerton, CA, October 20, 2018.
- (8) **M.R. Gherase** and **S. Al-Hamdani**, “Quantitative L-shell x-ray fluorescence measurements of Pb in plaster-of-Paris bone phantoms”, Annual Scientific Meeting of the American Physical Society (APS) Far West Section, California State University Fullerton, CA, October 20, 2018.
- (9) **S. Al-Hamdani** and **M.R. Gherase**, “Linear attenuation coefficients measurements in a polyoxymethylene soft tissue phantom for calibration of the L-Shell x-Ray fluorescence bone Pb data”, Annual Scientific Meeting and Exhibition of the American Association of Physicists in Medicine (AAPM), Nashville, TN, July 29, 2018.
- (10) **S. Al-Hamdani** and **M.R. Gherase**, “Reproducibility measurements in a grazing-incidence approach to Pb detection using L-shell x-ray fluorescence in a bone and soft tissue phantom assembly”, Central California Research Symposium, Fresno, CA, April 25, 2018.
- (11) **S. Al-Hamdani** and **M.R. Gherase**, “A novel L-shell x-ray fluorescence bone lead quantification method based on direct x-ray soft tissue attenuation measurement using a microbeam and a bone and soft tissue phantom assembly”, March Meeting of the American Physical Society (APS), Los Angeles, CA, March 7, 2018.
- (12) **S. Al-Hamdani** and **M.R. Gherase**, “A microbeam scanning method to determine the x-ray attenuation of the soft tissue for the L-shell x-ray fluorescence lead detection in a soft tissue and bone phantom assembly”, Annual Scientific Meeting of the American Physical Society (APS) Far West Section, University of California Merced, Merced, CA, November 3, 2017.
- (13) **S. Al-Hamdani** and **M.R. Gherase**, “Improving lead detection in plaster-of-Paris bone phantoms using a grazing-incidence x-ray fluorescence (GAXRF) method”, Annual Scientific Meeting and Exhibition of the American Association of Physicists in Medicine (AAPM), Denver, CO, August 2, 2017.
- (14) **S. Al-Hamdani** and **M.R. Gherase**, “Initial results of grazing-angle x-ray fluorescence (GAXRF) measurements of lead in plaster-of-Paris bone phantoms”, Young Investigator Symposium of the Northern

California Chapter of the American Association of Physicists in Medicine (AAPM), University of California, San Francisco Mission Bay Campus, San Francisco, CA, May 26, 2017.

- (15) **B. Avila** and **M. R. Gherase**, “Optimal sensitivity of x-ray fluorescence of arsenic in skin phantoms using an x-ray optics system”, Central California Research Symposium, Fresno, CA, April 18-19, 2017.
- (16) **S. Al-Hamdani**, **D. Tanielian**, and **M. R. Gherase**, “Improving lead detectability in plaster-of-Paris bone phantoms using a grazing-angle x-ray fluorescent measurement”, Central California Research Symposium, Fresno, CA, April 18-19, 2017.
- (17) **M.R. Gherase**, “Medical and biological applications of x-ray fluorescence”, invited talk in the Department of Physics at University of California, Merced, Merced, CA, January 20, 2017.
- (18) **M.R. Gherase** and **A. Freire-Gama**, “Measurement of soft tissue thickness using L_{β}/L_{α} ratio in L-shell x-ray fluorescence measurements of lead in bone and soft tissue phantoms”, the 29-th Annual CSU Biotechnology Symposium, Santa Clara, CA, January 5-7, 2017.
- (19) **M.R. Gherase** and A. Huda, “Tradition, innovation, and challenges in an undergraduate Biomedical Physics program at the California State University, Fresno”, the 29-th Annual CSU Biotechnology Symposium, Santa Clara, CA, January 5-7, 2017.
- (20) **B. Avila** and **M.R. Gherase**, “Optimal geometry of x-ray fluorescence arsenic detection in skin phantoms using an x-ray optics system”, Annual Meeting of the Far West Section of the American Physical Society at the University of California, Davis, Davis, CA, October 28, 2016.
- (21) **M.R. Gherase** and **A. Freire-Gama**, “L-shell X-ray Fluorescence (XRF) detection of lead in bone phantoms using a microbeam XRF system”, Annual Meeting of the Health Physics Society, Spokane, WA, July 18, 2016.
- (22) **M.R. Gherase**, “Medical applications of x-ray fluorescence”, invited talk in the Department of Physics at the California State University, San Diego, San Diego, CA, April 15, 2016.
- (23) **M.R. Gherase** and **A. F. Vargas**, “Microbeam measurements of an integrated x-ray tube and polycapillary x-ray lens system for biomedical x-ray fluorescence research”, Annual Meeting of the Far West Section of the American Physical Society at the California State University, Long Beach, Long Beach, CA, October 29-31, 2015.
- (24) E. Da Silva, B. Kirkham, J.W. Groves, **M.R. Gherase**, D.E.B. Fleming, A. Pejović-Milić, “*In vivo* quantification of strontium in bone using handheld X-ray fluorescence spectrometers”, International Society for Trace Element Research in Humans, Tokyo, Japan, November 18-22, 2013. *Winner of “Young Investigator Award”* for Eric Da Silva.
- (25) D.E.B. Fleming, **M.R. Gherase**, M. Anthonisen. “Calibrations for measurement of manganese and zinc in nail clippings using portable XRF”, European X-ray Spectrometry Conference, Vienna, Austria, June 18-22, 2012.
- (26) D.E.B. Fleming and **M.R. Gherase**. “A method for detecting trace concentrations of arsenic and selenium in nail clippings using a portable x-ray fluorescence device”, 8th International Topical Meeting on Industrial Radiation and Radioisotope Measurement Applications, hosted by Kansas State University, conference in Kansas City, MO, June 26 – July 1, 2011.
- (27) **M.R. Gherase** and D.E.B. Fleming. “Calculation of depth-dependent elemental concentration with x-ray fluorescence using a layered calibration method”. Canadian Association of Physicists Congress, St. John’s, NL, June 13-17, 2011.
- (28) D.E.B. Fleming, **M.R. Gherase**, K.M. Alexander. “A miniature x-ray tube approach to measuring lead in bone using L-XRF”. European X-ray Spectrometry Conference, Figueira da Foz, Portugal, June 20-25, 2010.
- (29) **M.R. Gherase**, J.E. Mader, D.E.B. Fleming. “Radiation dose from a proposed measurement of arsenic and selenium in human skin”, Canadian Organization of Medical Physicists, Ottawa, Ontario, June 16-19, 2010.
- (30) **M.R. Gherase**, D.E.B. Fleming, C.-Y. Kim. “Detecting arsenic and defining its micro-distribution in skin phantoms”. Canadian Association of Physicists Congress, Moncton, New Brunswick, Canada, June 7-10, 2009.
- (31) **M.R. Gherase**, M.E. Vallee, D.E.B. Fleming, “Simultaneous detection of arsenic and selenium in polyester resin skin phantoms”, 7th International Topical Meeting on Industrial Radiation and Radioisotope Measurement Applications, Czech Technical University, Prague, Czech Republic, June 22-27, 2008.
- (32) D.E.B. Fleming, I.S. Eddy, **M.R. Gherase**, M.K. Gibbons, G.A. Gagnon, “Real-time monitoring of arsenic filtration by granular ferric hydroxide”, 7th International Topical Meeting on Industrial Radiation and Radioisotope Measurement Applications, Czech Technical University, Prague, Czech Republic, June 22-27, 2008.

- (33) **M.R. Gherase**, M. Vallee, D.E.B. Fleming, “K-shell x-ray fluorescence measurements using the fundamental parameter method”, Canadian Association of Physicists Congress, Quebec, QC, June 8-11, 2008.
- (34) D.E.B. Fleming and **Mihai Gherase**, “Arsenic distribution in human skin”, Canadian Light Source, Saskatoon Synchrotron Summer School, Saskatoon, SK, August 20-24, 2007.
- (35) D.E.B. Fleming, G. Brown, R. Dauphinee, **M.R. Gherase**, “Advances in Arsenic and Lead Measurement”, CIHR RURAL Centre Annual Summit, Saint Mary’s University, Halifax, Nova Scotia, September 28-29, 2006.
- (36) **M.R. Gherase**, “Characterization of hyperpolarized ^{129}Xe dissolved in perfluorooctyl bromide emulsions as a novel magnetic resonance contrast agent”, XEMAT III: The Third International Symposium on Xenon Nuclear Magnetic Resonance of Materials, Ottawa, Ontario, Canada, June 1-3, 2006.
- (37) **M.R. Gherase**, J.C. Wallace, G.E. Santyr, “Flow measurements using hyperpolarized ^{129}Xe dissolved in a perfluorocarbon emulsion carrier”, the 4-th Annual Symposium of the Imaging Network Ontario, Toronto, Ontario, Canada, March 1-3, 2005
- (38) **M.R. Gherase**, J.C. Wallace, G.O. Cron, G.E. Santyr, “Theoretical analysis and measurement of the time course of hyperpolarized ^{129}Xe dissolved in a large diameter ($>3\ \mu\text{m}$) perfluorocarbon emulsion carrier”, the 3-rd Annual Symposium of the Imaging Network Ontario, Toronto, Ontario, Canada, March 3-5, 2004.
- (39) **M.R. Gherase**, J.C. Wallace, L. Bernas, M. Nezamadeh, I. Cameron, G.E. Santyr, “Multi-exponential analysis of CPMG T_2 decay curves for ^{129}Xe dissolved in PFOB emulsions: implications for hyperpolarized xenon agent development”, the 11-th Scientific Meeting and Exhibition of the International Society for Magnetic Resonance in Medicine, Toronto, Ontario, Canada, July 10-16, 2003.
- (40) J.C. Wallace, **M.R. Gherase**, L. Bernas, A. Cross, G.O. Cron, G.E. Santyr, “Magnetic resonance imaging flow measurement using hyperpolarized ^{129}Xe in a perfluorocarbon carrier injected in a hollow-fiber capillary model of a breast tumor”, the 3-rd Scientific Conference of the Canadian Breast Cancer Research Alliance, Ottawa, Ontario, Canada, October 25-27, 2003.

PUBLISHED ABSTRACTS

- (1) **S. Al-Hamdani** and **M.R. Gherase**, “Linear attenuation coefficients measurements in a polyoxymethylene soft tissue phantom for calibration of the L-shell x-ray fluorescence bone Pb data”, *Medical Physics* **45**(6): 2729 (2018)
- (2) **S. Al-Hamdani** and **M.R. Gherase**, “Improving lead detection in plaster-of-Paris bone phantoms using a grazing-incidence x-ray fluorescence (GAXRF) method”, *Medical Physics* **44**(6): 3201 (2017)
- (3) **M.R. Gherase**, J.E. Mader and D.E.B. Fleming. “Radiation dose from a proposed measurement of arsenic and selenium in human skin”, *Medical Physics* **37**(7): 3892-3893 (2010)
- (4) **M.R. Gherase**, D.E.B. Fleming, C.-Y. Kim. “Detecting arsenic and defining its micro-distribution in skin phantoms”, *Physics in Canada* **65**(2a): 106-107 (2009)
- (5) **M.R. Gherase**, M. Vallee, D.E.B. Fleming. “K-shell X-ray fluorescence measurements using the fundamental parameter method”, *Physics in Canada* **64**: 123 (2008)

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- (1) **M.R. Gherase** and D.E.B. Fleming, Probing trace elements in human tissue with synchrotron radiation, *Crystals*, **10**(1), 12, (2020)
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- (3) **M.R. Gherase** and **S. Al-Hamdani**, A microbeam grazing-incidence approach to L-shell x-ray fluorescence measurements of lead in bone and soft tissue phantoms, *Physiological Measurement*, **39** 035007 (2018)
- (4) **M.R. Gherase**, R. Feng, D.E.B. Fleming, Optimization of L-shell X-ray fluorescence detection of lead in bone phantoms using synchrotron radiation, *X-ray Spectrometry*, **46**: 537-547 (2017)
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- (6) **M.R. Gherase** and **A.F. Vargas**, Effective X-ray beam size measurements of an X-ray tube and polycapillary X-ray lens system using a scanning X-ray fluorescence method, *Nuclear Instruments and Methods in Physics Research B*, **395**: 5-12 (2017)

- (7) C. Groskopf, S.R. Bennett, **M.R. Gherase**, D.E.B. Fleming, Detection of lead in bone phantoms and arsenic in soft tissue phantoms using synchrotron radiation and a portable x-ray fluorescence system, *Physiological Measurement*, **38**(1): 374-386 (2017)
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- (14) **M.R. Gherase** and D.E.B. Fleming, A calibration method for proposed XRF measurements of arsenic and selenium in nail clippings, *Physics in Medicine and Biology* **56**(20):N215-N225 (2011)
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- (1) **M.R. Gherase**, Analysis of theoretical NMR spectra generated by exact solutions of the Bloch-McConnell and the Bloch-Torrey equations for a two-compartment radial diffusive exchange model, arXiv:1204.6678v1 [physics.med-ph] (2012)
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