KRZYSZTOF WAWRZYN, M.Sc.

London, ON | 226-224-5525 | kwawrzyn@gmail.com | http://wawrzyn.ca | linkedin.com/in/wawrzyn

RESEARCH ASSOCIATE

R&D LEADERSHIP | MEDICAL DEVICE TESTING | LABORATORY MANAGEMENT

Experienced scientific researcher in the biomedical physics & imaging field with over 12 years of experience planning & executing experiments & investigations, collecting & analyzing data, troubleshooting & solving complex problems, and presenting & publishing key findings.

CORE COMPETENCIES

Coding/Programming | Signal Processing & Analysis | Image Processing & Analysis | Fourier Analysis | Data Collection | MRI Physics | FDTD Simulations | 3D Modeling | Database Design | Project Management | Laboratory Experimentation | Technical Writing | Quality Assurance | Quality Management System | Data Science

RESEARCH EXPERIENCE

RESEARCH ASSOCIATE IN MRI-RELATED MEDICAL DEVICE TESTING 2014–PRESENT
Dept. of Physics & Astronomy, Western University *London, ON*

- Managed numerous simultaneous research- and client-based projects that investigated the magnetic resonance imaging (MRI) environment effects on hundreds of medical devices.
- Measured & simulated radio frequency (RF)-induced and gradient-induced heating.
- Planned & executed measurement setups, developed computational simulation studies, and collected, processed & analyzed temporal data.
- Developed verification & validation (V&V) protocols leading to publication.
- Identified & reduced measurement uncertainty contributors and developed precise measuring techniques that agree with ASTM standards, helping directly lead to achieving ISO/IEC 17025 accreditation.
- Oversaw the day-to-day operation of an ISO/IEC 17025 accredited testing & calibration laboratory.
- Developed a quality management system in the form of a relational database that matches the ISO/IEC 17025 standard requirements and internal laboratory needs.
- Wrote & revised standard operating procedures (SOP) and technical forms for various test equipment and protocols.
- Published and presented novel findings at international conferences.
- Trained & mentored junior team members and students.

GRADUATE RESEARCH ASSISTANT IN MRI-PHYSICS 2012–2014
Dept. of Medical Biophysics, Robarts Research Institute *London, ON*

- Demonstrated the viability of using a novel magnetic resonance imaging (MRI) pulse sequence for hyperpolarized gas lung imaging.
- Worked closely with principal investigators to modify, test, troubleshoot and calibrate an MRI pulse sequence, leading to a final publishable product.
- Planned & performed *in vitro* & *in vivo* MRI experiments and operated a low field MRI scanner to collect MRI data.
- Operated & maintained a xenon polarizer system and collected hyperpolarized gas for MRI experiments.

- Coded MATLAB routines to efficiently processes and analyze MRI results, in particular k-space, T_1, p_AO_2, T_2*, and ADC maps.
- Performed a randomized, controlled, double-blind pilot study of radiation induced lung injury (RILI) in animals, demonstrating statistically significant results.
- Presented oral talks at conferences and successfully defended dissertation leading to achieving M.Sc. degree.

RESEARCH ASSISTANT IN MEDICAL IMAGING 2009–2012
Dept. of Physics, Ryerson University *Toronto, ON*

- Lead a pre-clinical medical imaging research project from initiation to completion, to develop a novel protocol showing the feasibility of using OCT to detect and image the electric field-induced response in biological tissues.
- Planned & executed experimental setups in different biomedical laboratories using medical imaging & therapeutic modalities, in particular optical coherence tomography (OCT), ultrasound, and high intensity focused ultrasound (HIFU).
- Developed image & signal processing algorithms in MATLAB to process & analyzed raw medical imaging test data and extract relevant parametric information.
- Built and maintained strong, trusting relationships with research partners by working collaboratively & managing communication between all stakeholders.
- Presented findings at conferences, published paper in Optics Letters, and submitted dissertation in support of B.Sc. degree.

RESEARCH STUDENT IN MICROBIOLOGY 2009
Research Operations, Trojan Technologies *London, ON*

- Worked with senior researchers, scientists, and engineers in a supportive role at various stages of the water treatment process.
- Collected wastewater samples from city wastewater treatment plants and disinfected microorganisms with irradiation using ultraviolet (UV) collimator beams.
- Applied laboratory techniques for culturing cells and filtering, testing, and analyzing wastewater contaminants.
- Assembled UV water disinfection modules and reactors within a multi-disciplinary team, requiring collaboration and cooperation.
- Awarded research honorarium in recognition for contributions to the research projects.

OTHER WORK & LEADERSHIP EXPERIENCE

COMMUNITY ASSISTANT IN CO-OPERATIVE HOUSING 2011–2012
Neill-Wycik Co-operative College *Toronto, ON*

- Fostered the development of relationships among 40 residents.
- Worked closely with the computer laboratory manager to assist with computer networking operations, user support, updating workstations, and providing member orientations.
- Provided resident orientations, organized committees & workshops, designed posters, coordinated building wide recycling duties, and acted as an information resource.

PRODUCTION ASSEMBLER IN MANUFACTURING 2001–2010
OES Inc. *London, ON*

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- Worked 9 years supporting technology manufacturing needs, providing highly experienced manufacturing assembly, soldering and hardware installations.
- Assembled numerous electronic and mechanical devices using operational knowledge of hand tools, power tools, measuring equipment, assembly fixtures and testing devices.
- Completed tasks such as moving supplies, organizing products, and packaging shipments.
- Supported machine operators in setup and operation of production equipment resulting in efficient runs.
- Serviced faulty electronic and mechanical parts and connections through inspection, troubleshooting, and repair.
- Inspected final products to assess compliance with quality standards and established tolerances.

EDUCATION

Master of Science, M.Sc. (Medical Biophysics) 2012–2014
Western University *London, ON*

Bachelor of Science, B.Sc. (Medical Physics) 2007–2012
Ryerson University *Toronto, ON*

Diploma, (Computer Systems Technician) 2003–2006
Fanshawe College *London, ON*

TECHNICAL SKILLS

Computer Software and Application:

- MATLAB
- Python
- Sim4Life
- EMPro
- HTML/CSS
- Solidworks
- GraphPad Prism
- MS Access

Engineering & Machine Shop:

- Soldering iron
- Signal waveform generator
- Oscilloscope
- Multi-meter
- Network analyzer
- Vertical & horizontal band saw
- Belt sander
- Drill press
- Various manufacturing and shop tools

Device Testing and Calibration Equipment:

- RF Exposure Systems for 64MHz & 128MHz (ZMT MITS).
- Gradient Exposure Systems (prototype).
- Single-Point Vibrometry (Polytec OFV-5000).
- RF E-field/B-field Probing (Speag EASY4/TDS).
- Fiber Optic Temperature Monitoring (Neoptix Omniflex/Reflex).

Biomedical Imaging & Therapy Equipment:

- MRI (1.5T, 3.0T, Low field).
- Optical Coherence Tomography (Thorlabs swept source).
- Ultrasound (Ultrasonic RP).
- High-Intensity Focused Ultrasound (prototype).
- Xenon-129 Hyperpolarizer (prototype).

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PUBLICATIONS

1. (SUBMITTED) Ouriadov A, Perron S, **Wawrzyn K,** Hickling S, Fox M, Serrai H, Santyr G. " Application of a 2D Frequency Encoding Sectoral Approach to Hyperpolarized 129Xe MRI at Low Field", *Journal of Magnetic Resonance (2021).*
2. Attaran A, Handler W, **Wawrzyn K**, Chronik BA. "Electric field probe for time-domain monitoring of radio frequency exposure during development and evaluation of MRI-conditional medical devices at 3 T". *IEEE Trans. Antennas. Propag. IEEE Transactions on Antennas and Propagation 67.3 (2018): 1854-1861.*
3. Ryan K, **Wawrzyn K**, Gati JS, Chronik BA, Wong D, Duggal N, Bartha R. "1H MR spectroscopy of the motor cortex immediately following transcranial direct current stimulation at 7 Tesla". PloS one 13.8 (2018): e0198053.
4. Attaran A, Handler W, **Wawrzyn K**, Menon R, Chronik BA. "Reliable RF B/E-field Probes for Time-Domain Monitoring of EM Exposure During Medical Device Testing". *IEEE Trans. Antennas. Propag. IEEE Transactions on Antennas and Propagation 65.9 (2017): 4815-4823.*
5. **Wawrzyn K**, Demidov V, Vuong B, Harduar MK, Sun C, Yang VXD, Doganay O, Toronov V, and Xu Y. "Imaging the Electro-kinetic Response of Biological Tissues with Optical Coherence Tomography". *Optics Letters* 38, no. 14 (2013): 2572-2574.

CONFERENCE PROCEEDINGS

1. Attaran A, Handler W, **Wawrzyn K**, Chronik BA. "Development of a Transfer-Function Measurement Procedure for the Evaluation's of MRI-Conditional Medical Devices at 3T". *2018 IEEE Canadian Conference on Electrical & Computer Engineering (CCECE)*. IEEE, (2018).
2. **Wawrzyn K**, Vuong B, Harduar MK, Yang VXD, Demidov V, Toronov V, Xu Y. "Monitoring Electric Current in Biological Tissues by Optical Coherence Tomography". *Biomedical Optics* (2012): BW2A.4.

ABSTRACTS AND PRESENTATIONS

1. **Wawrzyn K,** Hendriks J, Gignac D, Handler W, Chronik BA. "Comparison of Robotically Mapped and Simulated RF Fields in 64 and 128 MHz Medical Implant Test Systems". 2019 Imaging Network Ontario Symposium, London, Canada (Poster presentation).
2. **Wawrzyn K,** Hendriks J, Gignac D, Handler W, Chronik BA. "Comparison of Simulated and Robotically Mapped RF Fields in 64 and 128 MHz Medical Implant Test Systems". 2019 International Society for Magnetic Resonance in Medicine (ISMRM), Montréal, QC, Canada. p. 7358. (Poster presentation).
3. **Wawrzyn K,** Hendriks J, Handler W, Chronik BA. "Estimated Measurement Uncertainty (EMU) in Calorimetrically-Determined Whole Body SAR Values for Medical Device Evaluation Using Benchtop Radiofrequency Exposure Systems". 2018 International Society for Magnetic Resonance in Medicine (ISMRM), Paris, France. p. 8264. (Poster presentation).
4. **Wawrzyn K,** Hendriks J, Handler W, Chronik BA. "Measurement Repeatability & Reproducibility in Radiofrequency Implant Heating in Benchtop Exposure Systems". 2017 ISMRM Workshop on Ensuring RF Safety in MRI, Honolulu, USA. p. 20. (Oral and poster presentation).
5. **Wawrzyn K,** Hendriks J, Handler W, Chronik BA. "Uncertainty Assessment of Local SAR Mapping from Radiofrequency-Induced Heating of a Standardized 10.0 cm-Long

Titanium Rod in the ASTM Phantom at 64 and 128 MHz". 2017 ISMRM Workshop on Ensuring RF Safety in MRI, Honolulu, USA. p. 19. (Oral and poster presentation).

6. **Wawrzyn K,** Drozd J, Hendriks J, Handler W, Chronik BA. "Resolving Local SAR In Vitro from RF-Field Induced Heating of a 5.0 cm Long Titanium Rod at 64 MHz and 128 MHz". 2017 International Society for Magnetic Resonance in Medicine (ISMRM), Honolulu, USA. p. 2643. (Poster presentation).
7. Ryan K, **Wawrzyn K**, Gati J, Chronik BA, Duggal N, Bartha R. "R 7 Tesla 1H MR Spectroscopy of the Motor Cortex following Transcranial Direct Current Stimulation". 2017 International Society for Magnetic Resonance in Medicine (ISMRM), Honolulu, USA. p. 2980. (Poster presentation).
8. Martire D, **Wawrzyn K**, Handler W, Chronik BA. "Measuring Gradient-Induced Vibration of a Conductive Device using Laser Doppler Vibrometry at 3T". 2016 International Society for Magnetic Resonance in Medicine (ISMRM), Singapore (E-poster presentation).
9. **Wawrzyn K,** Ouriadov A, Hickling S, and Santyr G. **"**Mapping ^{129}Xenon ADC of Radiation-Induced Lung Injury at Low Magnetic Field Strength Using a Sectoral Approach". 2015 International Society for Magnetic Resonance in Medicine (ISMRM), Toronto, Canada (Poster presentation).
10. Doganay O, Wade T, Hegarty E, **Wawrzyn K**, Schulte R F, McKenzie C, and Santyr G. "Hyperpolarized ^{129}Xe Imaging of the Lung using Spiral IDEAL". 2015 International Society for Magnetic Resonance in Medicine (ISMRM), Toronto, Canada (Poster presentation).
11. **Wawrzyn K. "**Implementation of a Non-Cartesian Pulse Sequence for MRI using hyperpolarized xenon-129". 2014 Medical Biophysics Seminar, Western University, London, Canada (Oral presentation).
12. **Wawrzyn K,** Ouriadov A, Hickling S, and Santyr G. **"**A Pseudo Non-Cartesian Pulse Sequence for Hyperpolarized Xenon-129 Gas MRI of the Lungs at Low Magnetic Field Strength". 2014 Imaging Network Ontario Symposium, Toronto, Canada (Poster presentation).
13. Doganay O, Wade T, Hegarty E, **Wawrzyn K,** McKenzie C, and Santyr G. **"**Hyperpolarized ^{129}Xe Imaging of the Lung using Spiral IDEAL". 2014 Imaging Network Ontario Symposium, Toronto, Canada (Poster presentation).
14. Hegarty E, Engelberts D, Wade T, **Wawrzyn K,** Doganay O, Kavanagh B, and Santyr G. **"**Hyperpolarized Xenon-129 MRI for Evaluation of a Continuous Negatively-Applied Pressure (CNAP) Approach for Recruitment of Atelectasis in a Rat Model". 2014 American Thoracic Society International Conference, San Diego, USA (Poster presentation).
15. **Wawrzyn K. "**Implementation of a Non-Cartesian Pulse Sequence for MRI using hyperpolarized xenon-129". 2013 Medical Biophysics Seminar, Western University, London, Canada (Oral presentation).
16. **Wawrzyn K,** Ouriadov A, Hickling S, Santyr G. **"**Implementation of a Novel Non-Cartesian Pulse Sequence for MRI of the Lungs with Hyperpolarized ^{129}Xe". 2013 London Imaging Discovery, London, Canada (Poster presentation).
17. **Wawrzyn K,** Ouriadov A, Hickling S, Santyr G. **"**Development of a non-Cartesian pulse sequence for MRI of the lungs with hyperpolarized ^{129}Xe". 2013 Imaging Network Ontario Symposium, Toronto, Canada (Oral and poster presentation).
18. **Wawrzyn K**, Yang VXD, Xu Y. "The Effects of Electric Current in Biological Tissues on Optical Coherence Tomography Signals". 2010 Canadian Association of Physicists Congress, Toronto, Canada (Oral presentation).

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TRAINING & CERTIFICATES

1. MS Access Level I and Level II 2019
2. Internal Auditor Training for ISO 17025 / IEC 2019
3. Workplace Hazardous Materials Information System (WHMIS) 2015
4. Standard First Aid/CPR (Level C) 2012
5. Imaging Labs Machine Shop/NC Mill Room Safety 2012
6. Laboratory Environmental Waste Management Safety 2012
7. Biosafety Training 2012
8. Laser Safety Training 2012
9. Animal Care and Veterinary Services (Advanced rat techniques, gas anesthesia, tail vein catheterization, surgery methodology I & II) 2012

RELEVANT COURSEWORK

Continuing Education Courses

Access 2016 Level II – Microsoft Access, Western University, 2019.

Access 2016 Level I – Introduction to Microsoft Access, Western University, 2018.

CADD-5016 – Advanced Solidworks, Fanshawe College, 2017.

PJMG6201-019 – Intro to Project Management, Western University, 2016.

Graduate Courses

Medical Biophysics – Nuclear Magnetic Resonance, MRI Physics, Scientific Communications

Undergraduate Courses

Medical Physics – Biophysics, Medical Imaging, Radiation Biology, Radiation Therapy

Computer Modeling – Advanced Programming for Scientists, Image Analysis, Computational Methods, Numerical Analysis

AWARDS

1. Western Graduate Research Scholarship 2012–2014
2. Trojan Technologies Research Honorarium 2009

REFERENCES

Available upon request.