Ethan MacDonald, PhD, PEng, SMIEEE

Last Updated: October 1, 2023

1. BIOGRAPHICAL DATA

Present Position:
Assistant Professor,
Dept. of Biomedical Engineering,
University of Calgary
E-mail: Ethan.MacDonald@UCalgary.ca

Full Address:
Information and Communication Technologies (ICT) Building, Room 452
University of Calgary, 2500 University Dr. NW
Calgary, Alberta, Canada. T2N 1N4

2. PROFESSIONAL RECORD

2.1. Academic Record

2.1.1. Undergraduate

Diploma, 2005. Electronic Engineering Technician,
Nova Scotia Community College, Halifax/Kentville, Nova Scotia, Canada.

- Technician program focused on electronics design and fabrication
- Instructors: Jim Innis and Ron Gillis
- Subjects Studied: Communications, Electronic Drafting, Analog/Digital Comm, DC/AC Theory, Digital Logic, Fabrication, Computer Hardware and Networking, Semiconductors, Electric Machines, Microcontroller programming, Business, PLC (Programmable Logic Controllers), and Applied Math

Diploma, 2006. Electronic Engineering Technologist,
Nova Scotia Community College, Halifax/Kentville, Nova Scotia, Canada.

- Technologist program extending from technician diploma at the NSCC
- Additional Subjects: Calculus, Computer Hardware, Computer Programming (C/C++), Data Acquisition Programming, Embedded Controllers and Systems, Quality and Statistics, and Business Management

B.Sc., 2008. Electrical Engineering.
Lakehead University, Thunder Bay, Ontario, Canada.

- Thesis: *A Single Wheel Gyroscopically Stabilized Robot*
- Advisor: Krishnamoorthy Natarajan, PhD
- Subjects Studied: Engineering Mathematics, Circuit Design, Electric Machines, Electromagnetic Physics, Power Systems Analysis, Power Electronics, Robotics, Control Systems, VLSI, Numerical Methods, Digital Signal Processing and Philosophy.

2.1.2. Graduate

M.Sc., 2010. Biomedical Engineering.
University of Calgary, Calgary, Alberta, Canada

- Thesis: *Passive Catheter Tracking in the Carotid Artery with Accelerated Magnetic Resonance Imaging*
- Advisor: Richard Frayne, PhD
- Summary of Research: Development of real-time infrastructure for visualizing endovascular catheters with MRI. Demonstrated navigation from the femoral to the carotid artery in a canine model.

Ph.D., 2014. Biomedical Engineering.
University of Calgary, Calgary, Alberta, Canada

- Thesis: *Quantitative Cerebrovascular Magnetic Resonance Imaging*
- Advisor: Richard Frayne, PhD
- Summary of Research: Examined methods for acquiring angiographic images of the brain, primarily focused on the technical aspects of phase contrast velocity encoding, arterial spin labelling, and flow asymmetry.

2.1.3. Post-doctoral

P.D.F., 2019. Radiology.
University of Calgary, Calgary, Alberta, Canada

- Project: *Magnetic Resonance Imaging of Healthy Brain Aging*
- Advisor: Bruce Pike, PhD
- Summary of Research: MRI Development, Supercomputing and Big Data Applications, Quantitative Functional MRI, Imaging of Brain Aging

2.2. Academic and Other Appointments

Full Member **February 2023 - Present**

Alberta Children's Hospital Research Institute
University of Calgary

Adjunct Professor **December 2020 - Present**

Department of Radiology
Cumming School of Medicine
University of Calgary

Full Member **December 2020 - Present**

Hotchkiss Brain Institute
University of Calgary

Assistant Professor **September 2020 - Present**

Department of Biomedical Engineering
and Department of Electrical and Software Engineering
Schulich School of Engineering
University of Calgary

Research Scientist **2020**

At the Hotchkiss Brain Institute under the supervision of Prof. Bruce Pike.

- MRI Development
- Supercomputing and Big Data Applications
- Quantitative Functional MRI

Consultant / Developer **2012 to 2013**

QTS Capital Management, LLC

- Development of High Frequency Trading Systems
- Interfacing through Knight Capital and Interactive Brokers
- Supervisor: Ernest P. Chan, PhD | Blog

Research Assistant **Summer 2008**

University of Calgary, Department of Electrical Engineering

- Investigated deconvolution algorithms for obtaining perfusion measurements
- Worked under the supervision of Michael R. Smith, PhD

Electronics Technician / Research Assistant **Summer 2005**

Bedford Institute of Oceanography

- Design and fabrication of electronics for oceanographic instruments
- Development of infrared camera system for counting eels during migration
- Worked under the supervision of Brian Beanlands

2.3. Professional Certification and Memberships in Learned Societies

- Association Professional Engineers, Geoscientists of Alberta (APEGA) Professional Member
- The International Society for Cerebral Blood Flow and Metabolism (ISCBFM) Full Member
- International Society to Advance Alzheimer's Research and Treatment (ISTAART) Member
- International Society of Magnetic Resonance in Medicine (ISMRM) Member
- Institute of Electrical and Electronics Engineers (IEEE) Senior Member
- Organization for Human Brain Mapping (OHBM) Member
- American Heart Association (AMA) Member
- University of Calgary Alumni Association
- Lakehead University Alumni Association
- Nova Scotia Community College Alumni Association
- Canadian Ski Patrol (CSP)

2.4. Awards, Distinctions and Fellowships

2022/01 - 2023/01	Wiley Top Downloaded Paper in NMR in Biomedicine DOI:10.1002/nbm.4564
2019/01 - 2020/01	CONP Research Scholar Award
2017/04	ISMRM Magna Cum Laude
2016/05	ISMRM Educational Stipend
2015/06	ISMRM Educational Stipend
2014/06/12	Radiology Research Day - Best Presentation by a Researcher
2014/09 - 2016/09	I3T NSERC CREATE PDF
2014/05	ISMRM Educational Stipend
2013/06	NIH Young Investigator Travel Stipend to Society for MRA
2013/05	Canadian Ski Patrol - Appreciation Award
2012/05&09	Biomedical Engineering Graduate Program Travel Award
2012/05	Faculty of Graduate Studies Travel Stipend
2011/09	Society for Magnetic Resonance Angiography Trainee Stipend
2011/09 - 2014/08	T. Chen Fong Doctoral Scholarship
2010/09 - 2014/08	Alberta Innovates - PhD Student Training Program
2010/09 - 2013/04	NSERC - Post Graduate Scholarship
2010/05	Faculty of Graduate Studies Travel Stipend
2010/04	University of Calgary - Diagnostic Imaging Research Award
2010/04 - 2010/08	Queen Elizabeth II Graduate Scholarship
2009/04 - 2010/04	NSERC - Graham Bell Canadian Graduate Scholarship
2009/04 - 2010/04	ICore - Graduate Scholarship in ICT
2008/08 - 2009/04	Queen Elizabeth II Graduate Scholarship
2008/04 - 2009/08	NSERC - Undergraduate Student Research Award
2008/06	Dean Braun Medal, Lakehead University
2008/06	PEO Medal for Academics (Professional Engineers of Ontario)
2006-2008	Lakehead University Award for Academics

3. EDUCATIONAL ACTIVITIES

3.1. Instruction

Biomedical Engineering 415 - Sensor Systems and Data Analytics **2020 to present**

Role: Instructor
Introduction to matrix and tensor manipulation with focus on computer programming aspects. Sensor systems and design of data collection strategies, with examples in relevant areas of biomedical engineering. Data curation and conditioning including outlier and anomaly pattern detection, noise removal and data reduction. Unsupervised clustering and association mining using machine learning techniques. Supervised classification using advanced machine learning techniques. Completion of a sensor- and data-oriented project in the area of biomedical engineering.

Biomedical Engineering 509 - Intro to Biomedical Imaging and Applications **2022 to present**

Role: Instructor
Principles of various imaging modalities used in Biomedical engineering applications, including CT, MRI, ultrasound, PET, SPECT. Image processing operations: filtering, enhancement, feature extraction, pattern recognition and image reconstruction. Image registration and integration of different imaging modalities.

Electrical Engineering 619.03 - Advanced Data Analytics **2021 to present**

Role: Instructor
Research skills course designed to expand knowledge with supercomputing clusters, numerical methods, and analyses. Introduction to version control and source management. Data curation, management, and compliance. Using schedulers for parallelization. Benchmarking computational requirements. Machine learning and numerical processing for challenging data analytics problems. Reducing high dimensionality data for interpretation. Making graphics from data.

Medical Science 689.02 Advanced Magnetic Resonance Imaging **2021 to present**

Role: Guest Lecturer
Principles of signals and systems in the context of operating principles of biological systems at multiple physiological scales. Concept of frequency and time domains, Fourier and Laplace transforms. Sensors and actuators. Review of circuits and introduction to basic analog signal conditioning – amplification and filtering. Noise and mitigation. Introduction to CAD tools and mechanical design.

Teaching Assistant **2008 to 2014**

Department of Radiology, Department of Electrical Engineering,
and the Biomedical Engineering Graduate Program at University of Calgary

- Imaging Theory (MDSC 689.11)
- Advanced Medical Imaging (MDSC 689.01)
- Design and Communications I & II (ENG 251/253)
- Electric Circuit Theory (BMEN 327)
- Numerical Methods (ENG 407)

3.2. Graduate and Undergraduate Supervision

3.2.1. Graduate Students (Primary Supervision)

- **Karen Ardilla Lopez**, MSc Student, Biomedical Engineering; September, 2023 - Current
  2023-09-01 - Winner of the MITACS Graduate Fellowship $15,000 per year for 1 year
  2023-09-01 - Winner of the NSERC CREATE BRAIN $12,500 per year for 2 years
  2023-09-01 - Winner of the Alberta Graduate Excellence Scholarship $11,000 per year for 1 year
- **Mohammad Amin Moreshedi**, MSc Student, Biomedical Engineering; September, 2023 - Current
- **Rory Gilliland**, MSc Student, Biomedical Engineering; September, 2022 - Current
  2023-05-23 - Winner of the Upper Bound Talent Award - Alberta Award $500
  2023-05-01 - Winner of the the CIHR CGS-M $17,500
  2023-09-01 - Winner of the Alberta Graduate Excellence Scholarship $15,000 per year for 1 year
- **Pattarawut (Pat) Charatpangoon**, MSc Student, Biomedical Engineering; September, 2022 - Current
  2023-05-23 - Winner of the Upper Bound Talent Award - Alberta Award $500
- **Aashka Mohite**, MSc Student, Electrical and Software Engineering; September, 2022 - Current
  2022-09-01 - Winner of the NSERC CREATE BRAIN $12,500 per year for 2 years
  2022-09-01 - Winner of the Alberta Graduate Excellence Scholarship $11,000 per year for 1 year
  2023-03-09 - Awarded Second Place for Women in Data Science Presentation $200
  2023-05-23 - Winner of the Upper Bound Talent Award - Alberta Award $500
  2023-09-01 - Winner of the Alberta Graduate Excellence Scholarship $11,000 per year for 1 year
- **Fernando Vega**, MSc Student, Biomedical Engineering; September, 2021 - Current
  2021-10-22 - Winner of the BME Graduate Program Entrance Prize $1,500 one time
  2022-06-07 - Winner of the HBI Travel Award $500 one time
  2022-06-07 - Winner of the BME Travel Award $1000 one time
  2022-09-01 - Winner of the Alberta Graduate Excellence Scholarship $11,000 per year for 1 year
  2023-03-16 - Winner of the SSE Award for Graduate Assistants
  2023-06-03 - Winner of the ISMRM Travel Award $575 USD
- **Abdoljalil (Jalil) Addeh**, PhD Student, Biomedical Engineering; May, 2021 - Current
  2021-09-01 - Winner of the NSERC CREATE BRAIN $15,000 per year for 4 years
  2021-10-22 - Winner of the BME Graduate Program Entrance Prize $1,500 one time
  2022-05-23 - Winner of the AMII Travel Award $500
  2023-01-01 - Winner of the BME Research Excellence Award $5000
  2023-01-26 - Winner of the Engineering Student Society TA of the Semester Award $125
  2023-03-16 - Winner of the SSE Award for Graduate Assistants
  2023-03-23 - Winner of the ACHRI Travel Award $500
  2023-05-01 - Winner of the FGS PhD Entrance Award $20,000 for 1 year (declined)
  2023-05-01 - Winner of the Eyes High Doctoral Award $30,000 per years for 4 years
  2023-05-23 - Winner of the Upper Bound Talent Award - Alberta Award $500
  2023-05-23 - Winner of the BME Graduate Program Travel Award $1000
  2023-06-03 - Winner of the ISMRM Travel Award $575 USD

  Total Graduate Students Supervised: 7

3.2.2. Graduate Students (Co-Supervision)

- **Yousif Al-Khoury**, MSc Student, Biomedical Engineering; Sept, 2023 - Current
  Primary Supervisor - Sarah Manske
- **Neha Gianchandani**, MSc Student, Biomedical Engineering; September, 2021 - Current
  Primary Supervisor - Roberto Souza
  2021-09-01 - Winner of the NSERC CREATE BRAIN $10,500/year for 2 years (declined)
  2021-09-01 - Winner of the Alberta Innovates Graduate Student Scholarship $26,000/year for 2 years
  2021-09-01 - International Tuition Award $3000/year for 2 years
  2021-10-22 - Winner of the BME Graduate Program Entrance Prize $1500 (one-time)
  2022-03-08 - 3rd Prize at the Women in Data Science Conference at UCalgary $100
  2022-05-23 - AMII Travel bursary to attend AI Week - April 2022 - CA$500 (one-time)
  2022-05-23 - Grace Hopper Conference Scholarship (to cover cost of attendance)

- **Faezeh Shahidi**, PhD Student, Electrical and Computer Engineering; July, 2021 - Current
  Primary Supervisor - Geoff Messier
  2023-04-25 - Winner of the ESE 2023 Special Scholarship Award $1,500
  2023-08-31 - Robert B. Paugh Memorial Scholarship in Engineering $1,250

  Total Graduate Students Co-supervised: 3

3.2.3. Graduate Supervisory Committees

- **Iskindir Weldemeskel**, MSc Student, Biomedical Engineering; September 1, 2023 - Current
  Primary Supervisor: Pierre Levan
- **Asha Thomas**, PhD Student, Electrical Eng. at AMRITA Vishwa Vidyapeetham; Jan 25, 2023 - Current
  Primary Supervisor: Nagesh Subbanna
- **Manuel Zamudio Lopez**, PhD Student, Electrical Engineering; March 10, 2022 - Current
  Primary Supervisor: Hamid Zaraipour
- **Monisha Ghosh Srabanti**, PhD Student, Biomedical Engineering; March 1, 2022 - Current
  Primary Supervisor: Julio Garcia Flores
- **Mahshid Soleymani**, MSc Student, Biomedical Engineering; September, 2020 - Current
  Primary Supervisor: Yunyan Zhang

  Total Graduate Student Committees: 5

3.2.4. Internships

- **Daria Shumkova**, MITACS GlobalLink Internship; May, 2023 - Aug, 2023
- **Laura Garcia Mosquera**, MITACS GlobalLink Internship; May, 2023 - Aug, 2023
- **Pauline Delannoy**, MITACS GlobalLink Internship; May, 2023 - Aug, 2023
- **Soumee Mukherjee**, MITACS GlobalLink Internship; May, 2022 - Aug, 2022
- **Prathishtith Raj Medi**, MITACS GlobalLink Internship; May, 2022 - Aug, 2022
- **Karen Ardila Lopez**, MITACS GlobalLink Internship; May, 2021 - Aug, 2022
- **Baylee Cheung**, Undergraduate Level MITACS Internship; May, 2021 - Aug, 2021

  Total Internship Students Supervised: 7

3.2.5. Summer Student Mentorship

- **Artem (Tom) Spiian**, Summer Student; May, 2023 - August, 2023
  UCalgary Ukraine Refugee Resettlement Program
- **Amanda Ong**, Summer Student; May, 2023 - August, 2023
  Winner of the NSERC Undergraduate Student Research Award
- **Shabbit Hassan**, Summer Student; May, 2023 - August, 2023
  Winner of the Biomedical Engineering Summer Studentship Award
  Aug 22, 2023 - Best Talk at the Biomedical Engineering Undergraduate Research Symposium $50
- **Ahmed Elmenshawi**, Summer Student; May, 2023 - August, 2022
  Winner of the Biomedical Engineering Summer Studentship Award
- **Emmi Munroe**, Summer Student; May, 2022 - August, 2022
  Winner of the Biomedical Engineering Summer Studentship Award
  Winner of the Alberta Biomedical Engineering Conference Award $250
  Winner of the UCalgary Student Union Travel Award $200
- **Eremiahs Fikre**, Summer Student; May, 2021 - August, 2021
- **Khaled Elmalawany**, Summer Student; May, 2021 - August, 2021
  Winner of the Biomedical Engineering Summer Studentship Award
- **Branden Wong**, Summer Student; May, 2019 - August, 2019
- **Jeffery Hao**, Summer Student; May, 2018 - August, 2018
  Engineering Course Project Supervisor, September 2017 to April 2018
- **Micheal Taylor**, Summer Student; May, 2018 - August, 2018
- **Sarah Scot**, Summer Student; May, 2018 - August, 2018 & May to Dec 2019
- **Thomas Mosher**, Summer Student; May, 2017 - August, 2017

- **David Adair**, Summer Student; May, 2011 - August, 2011
- **Nolan Swailes**, Summer Student; May, 2010 - August, 2010 & 2012
- **Laura Sevick**, Summer Student; May, 2009 - August, 2009

Total Summer Students Supervised: 15

3.2.6. Undergraduate Capstone & Design Project Supervision

- **Capstone Project**, ENEL 500; Sept, 2023 - April, 2024
  Ahad Ali,
  Abhay Khosla,
  Rachel Renegado,
  Lauraine Baffot
- **Capstone Project**, ENEL 500; Sept, 2022 - April, 2023
  Jessica Ritchie,
  Kaitlyn Jenkins,
  Matthew Ocando,
  Weitao Wu,
  Manpreet Singh
- **Anthony Demong**, BMEN 501; Sept, 2021 - December, 2021

Total Capstone Students Supervised: 10

3.2.7. High School Students

- **Caitlin Liang**, HYRS Student; July, 2023 - Aug, 2023
- **Shawn Wang**, HYRS Student; July, 2023 - Aug, 2023
- **Kiran Bowron**, HYRS Student; July, 2022 - Aug, 2022

Total High School Students Supervised: 3

Total Student Trainees Supervised: 50

3.2.8. Thesis Committees

- **Yanzhao (Archibald) Qian**, MSc, Mathematics and Statistics. *MSc Defense* - September 8, 2023
  Role: External Examiner, Primary Supervisor: Quan Long
- **Reyna Crawford**, MSc, Biomedical Engineering. *MSc Defense* - September 6, 2023
  Role: Neutral Chair, Primary Supervisor: Darren Stefanyshyn
- **Maruthi Kumar Mutnuri**, MSc, Biomedical Engineering. *MSc Defense* - June 16, 2023
  Role: External Internal, Primary Supervisor: Joon Lee
- **Ateyeh Soroush**, PhD, Neuroscience. *PhD Candidacy* - March 13, 2023
  Role: External Internal, Primary Supervisor: Jeffery Dunn
- **Abhijot Sidhu**, MSc, Biomedical Engineering. *MSc Defense* - March 8, 2023
  Role: Neutral Chair, Primary Supervisor: Richard Frayne
- **Ahmed Al-Shafei**, PhD, Electrical & Software Engineering. *Candidacy Exam* - December 15, 2022
  Role: External Internal, Primary Supervisor: Hamidreza Zareipour
- **Justin Butler**, MSc, Electrical & Software Engineering. *Thesis Defence* - September 2, 2022
  Role: External Examiner, Primary Supervisor: Henry Leung
- **Kimberly Alejandra**, PhD, Biomedical Engineering. *Candidacy Exam* - August 31, 2022
  Role: Examiner, Primary Supervisor: Nils Forkert
- **Louise Neave**, MSc, Biomedical Engineering. *Thesis Defence* - August 10, 2022
  Role: Neutral Chair, Primary Supervisor: Elena Di Martino
- **Mada Hashem**, PhD, Biomedical Engineering. *Thesis Defence* - February 25, 2022
  Role: Neutral Chair, Primary Supervisor: Jeff Dunn

- **Cao Xingdong**, MSc, Electrical and Computer Engineering. *Thesis Defence* - January 17, 2022
  Role: Neutral Chair, Primary Supervisor: Svetlana Yanushkevich
- **Danielle Whittier**, PhD, Biomedical Engineering, *Thesis Defence* - August 5, 2021
  Role: Neutral Chair, Primary Supervisor: Steven Boyd
- **Zahra Kabirkhoo**, PhD, Electrical and Computer Engineering. *PhD Candidacy Exam* - June 28, 2021
  Role: Examiner, Primary Supervisor: Leonid Belostotski
- **Caleb John**, MSc, Electrical and Computer Engineering. *MSc Exam* - April 29, 2021
  Role: Examiner, Primary Supervisor: Geoff Messier
- **Michidmaral Otgondavaa**, *Undergraduate Thesis* - BMEN 500 requirement. - April 19, 2021
  "MRI texture analysis methods for advanced measurement of tissue pathology in Multiple Sclerosis."
  Role: Examiner, Primary Supervisor: Yunyan Zhang
- **King Ma**, PhD, Electrical and Computer Engineering. *PhD Candidacy Exam* - Feb 26, 2021
  Role: Examiner, Primary Supervisor: Henry Leung
- **Dalia Abdelhamid**, PhD, Electrical and Computer Engineering. *Thesis Defence* - Feb 23, 2021
  Role: Neutral Chair, Primary Supervisor: Andrew Knight
- **Soheila Zangeneh**, MSc, Electrical and Computer Engineering *Thesis Defence* - Jan 18, 2021
  Role: Neutral Chair, Primary Supervisor: Hadi Hemmati
- **Hanchong Zhou**, MSc, Electrical and Computer Engineering. *Thesis Defence* - Jan 14, 2021
  Role: Examiner. Primary Supervisor: Henry Leung
- **Pratham Singh**, MSc, Biomedical Engineering. *Thesis Defence* - Dec 15, 2020
  Role: Neutral Chair, Primary Supervisor: Diwakar Krishnamurthy
- **Sarah Shah**, MSc, Electrical and Computer Engineering. *Thesis Defence* - Dec 10, 2020
  Role: Neutral Chair. Primary Supervisor: Darren Stefanyshyn

Total Student Committees: 21

3.3. Post Doctoral Fellows Supervision

- **Fadamiro Akinwale**, ; September, 2023 - Current
  2023-09-01 - Winner of the Eyes High PDF Award $25,000 per year for 2 years

  Total Postdoctoral Fellows Supervised: 1

Total Funding Recieved by Trainees: $480,675
Total Funding Declined to Trainees: $40,500
Total Funding Awarded to Trainees: $521,175

4. SCHOLARLY ACTIVITIES

4.1. Research Funding

4.1.1. Awarded

Total funding awarded: $3,612,470

10. **Project Title:** Towards Building Advanced Machine Learning Image Translation Models to Estimate Amyloid-Beta and Tau PET Images from Structural MRI **Funding Organization:** Natural Sciences and Engineering Research Council of Canada(NSERC) - Alliance Advance **From:** 16-01-2023 **To:** 15-01-2025 **Collaborators:** Aravind Ganesh; Eric Smith; Nils Forkert **Coapplicants:** Gias Uddin; Qingrun Zhang **Amount:** $300,000 **Primary Applicant:** Ethan MacDonald
9. **Project Title:** Improving Magnetic Resonance Imaging Technologies for the Study of Brain Aging **Funding Organization:** Natural Science and Engineering Research Council **Competition:** Discovery Grants Program - Physics - 2022 **Application Number:** RGPIN-2022-03552 **From:** 01-04-2022 **To:** 31-03-2027 **Amount:** $157,500 **Primary Applicant:** Ethan MacDonald

8. **Project Title:** Developing a Magnetic Resonance Imaging (MRI) based pH Mapping Tool for Clinical Stroke Assessment **Funding Organization:** Brain Canada Foundation; Canadian Stroke Consortium Heart; and Stroke Foundation of Canada **Competition:** 2022 Catalyst Grant Competition **From:** 15-12-2022 **To:** 14-12-2024 **Collaborators:** Aravind Ganesh; Bijoy Menon **Amount:** $100,000 **Primary Applicant:** Ethan MacDonald
7. **Project Title:** Big Data and Machine Learning for MRI **Funding Organization:** University of Calgary; Start up funds **Amount:** $100,000 **Primary Applicant:** Ethan MacDonald
6. **Project Title:** Image Translation Models for Neurodegeneration **Funding Organization:** Hotchkiss Brain Institute: Private Donation **Competition:** Non-Competitive **From:** 01-01-2022 **To:** 31-12-2023 **Amount:** $50,000 **Primary Applicant:** Ethan MacDonald
5. **Project Title:** One Health Modelling Network for Emerging Infections **Funding Organization:** Natural Science and Engineering Research Council **Competition:** Emerging and Infectious Disease Modelling **Application Number:** RGPID-560520-2020 **From:** 15-03-2021 **To:** 31-03-2023 **Coapplicants:** Ethan MacDonald et al. **Amount:** $2,500,000 **Primary Applicant:** Huaiping Zhu
4. **Project Title:** Using Artificial Intelligence Based Solutions to Facilitate Clinical Trial Enrolment **Funding Organization:** Government of Canada **Competition:** New Frontiers in Research Fund - 2021 **Application Number:** NFRFR-2021-00009 **From:** 01-03-2022 **To:** 28-02-2024 **Coapplicants:** Ethan MacDonald et al. **Amount:** $237,970 **Primary Applicant:** Aravind Ganesh
3. **Project Title:** Big Data and Machine Learning for MRI **Funding Organization:** University of Calgary; Start up funds **Amount:** $25,000 **Primary Applicant:** Ethan MacDonald
2. **Project Title:** Neuronavigation of Low Intensity Focused Ultrasound for Neuromodulation **Funding Organization:** INOVAIT **Competition:** Innovation Fund **From:** 01-06-2021 **To:** 30-05-2022 **Coapplicants:** Samual Pichardo; Roch Comeau; Ethan MacDonald **Amount:** $125,000 **Primary Applicant:** Bruce Pike
1. **Project Title:** Using Big Data and Machine Learning in the UK Biobank to Determine the Genetics Associated with Accelerated Brain Aging: A Pilot Study **Funding Organization:** UCalgary VPR Catalyst **From:** 01-07-2023 **To:** 31-12-2023 **Coapplicants:** Quinrun Zhang; Nils Forkert; Eric Smith **Amount:** $17,000 **Primary Applicant:** Ethan MacDonald

4.1.2. Completed

Total funding (completed awards): $25,000

2. **Project Title:** Estimating Amyloid Beta Position Emission Tomography (PET) Images from standard Structural T1 weighted Magnetic Resonance Images (MRI): An Image Translation Project **Funding Organization:** VPR Catalyst Grant **Competition:** May 2021 Competition **Application Number:** RSO file no: 1057921 **From:** 01-10-2021 **To:** 31-12-2021 **Coapplicants:** Quinrun Zhang; Nils Forkert; Eric Smith **Amount:** $15,000 **Primary Applicant:** Ethan MacDonald
1. **Project Title:** Developer for RemBRAINdt-Scholarship **Funding Organization:** Mathematics of Information Technology and Complex Systems (MITACS) **From:** 01-05-2021 **To:** 31-12-2021 **Amount:** $10,000 **Primary Applicant:** Ethan MacDonald

4.1.3. Submitted

Total funding (Submitted): $4,894,666

8. **Project Title:** Validating Image Translation Models that Estimate Amyloid and Tau PET Images from MRI: A method for screening Alzheimer's Disease with MRI **Funding Organization:** CIHR Project Grant **From:** 01-09-2023 **To:** 31-08-2026 **Coapplicants:** Quinrun Zhang; Nils Forkert; Eric Smith; Aravind Ganesh **Amount:** $525,000 **Primary Applicant:** Ethan MacDonald
7. **Project Title:** Laying the foundation for virulence-based diagnostics **Funding Organization:** CIHR Project Grant **From:** 01-09-2023 **To:** 31-08-2026 **Coapplicants:** Ashlee Earl; Tanis Dingle; Ethan MacDonald **Amount:** $1,880,000 **Primary Applicant:** Ian Lewis

6. **Project Title:** Development of Advanced Machine Learning Models for Low Field MRI **Funding Organization:** Alberta Innovates **Competition:** NSERC Alliance Advance Stream 1 **From:** 01-09-2023 **To:** 31-08-2023 **Amount:** $39,666 **Primary Applicant:** Ethan MacDonald
5. **Project Title:** Cone-Beam Computed Tomography as a Novel Imaging Approach to Diagnosis and Treatment Monitoring in Rheumatoid Arthritis **Funding Organization:** The Arthritis Society **Competition:** Ignite Innovation Grant 2023 **From:** 01-01-2024 **To:** 31-12-2025 **Collaborators:** Stephanie Finzel; Camille Figueiredo **Coapplicants:** Ethan MacDonald; Claire Barber; Glen Hazlewood **Amount:** $100,000 **Primary Applicant:** Sarah Manske
4. **Project Title:** Using the UK Biobank to Characterize Brain Aging Mechanisms in Relation to Genetic Physical and Lifestyle Factors **Funding Organization:** CIHR **Competition:** Operating Grant - Mechanisms in Brain Aging and Dementia **From:** 01-01-2024 **To:** 31-12-2026 **Coapplicants:** Jolene Phelps; Philip Barber; Aravind Ganesh; Eric Smith; Nils Forkert; Quan Long; Bruce Pike; Matthias Wilms; Qingrun Zhang; Jennifer Zwicker **Amount:** $750,000 **Primary Applicant:** Ethan MacDonald
3. **Project Title:** Development of an Artificial Intelligence Enabled Low Field Portable Magnetic Resonance Image (MRI) System for Acute Stroke **Funding Organization:** Alberta Innovates **Competition:** AICE Concepts **From:** 01-01-2024 **To:** 31-12-2026 **Coapplicants:** Elise Fear; Bruce Pike; Zahra Abbasi; Aravind Ganesh; Jonathan Sharp; Boguslaw Tomanek; Sean Karkiwsky; Jullien Müller **Amount:** $700,000 **Primary Applicant:** Ethan MacDonald
2. **Project Title:** Role of the Simple Perfusion Reconstruction Algorithm (SPIRAL) on streamlining acute stroke diagnosis and treatment **Funding Organization:** Alberta Innovates **Competition:** AICE Concepts **From:** 01-01-2024 **To:** 31-12-2026 **Collaborators:** Ethan MacDonald; Nils Forkert **Coapplicants:** Connor McDougall; Manvir Gill; Gavin Lau; Dorothy Chacinski **Amount:** $600,000 **Primary Applicant:** Phillip Barber
1. **Project Title:** Streamlined and Efficient Core and OcclusioN Diagnosis of Stroke (SECONDS) Study **Funding Organization:** Heart and Stroke Foundation of Canada **Competition:** Heart and Stroke Foundation Grant-in-Aid **From:** 01-01-2024 **To:** 31-12-2026 **Coapplicants:** Shelagh Coutts; Ethan MacDonald; Nils Forkert **Amount:** $300,000 **Primary Applicant:** Phillip Barber

4.2. Presentations

1. (2022). Cerebrovascular Imaging and Applications to Aging. McGill BME Seminar Series, Montreal, QC, Montreal, Canada

4.3. Publications

4.3.1. Peer Reviewed Publications (Published)

22. Williams, R, Specht, J., Mazerolle, E., Lebel, M.R., **MacDonald**, **M.E.**, and Pike, G.B. Correspondence between BOLD fMRI task activation and cerebrovascular reactivity across the cerebral cortex. *Frontiers in Physiology - Medical Physics and Imaging* 14 (May 2023), p. 1167148.
DOI: 10.3389/fphys.2023.1167148.
21. Addeh, A, Vega, F, Medi, P, Williams, R.J, Pike, G.B, and **MacDonald**, **M.E.** Direct Machine Learning Reconstruction of Respiratory Variation Waveforms from Resting State fMRI Data in a Pediatric Population. *NeuroImage* 41 (April 2023), p. 119904.
DOI: 10.1016/j.neuroimage.2023.119904.
20. Kumar, H., Dixit, K., Sharma, R., **MacDonald**, **M.E.**, Sinha, N., and Kim, K. Closed-loop vasculature network design for bioprinting large, solid tissue scaffolds. *Biofabrication* 15 (2 February 2023), p. 024104.
DOI: 10.1088/1758-5090/acb73c.
19. Wilms, M., Bannister, J.J., Mouches, P., **MacDonald**, **M.E.**, Rajashekar, D., Langner, S., and Forkert, N.D. A Bidirectional Normalizing Flow Model of Brain Aging. *IEEE Transaction on Medical Imaging* 41.9 (March 2022).
DOI: 10.1109/TMI.2022.3161947.
18. **MacDonald**, **M.E.** and Pike, G.B. Magnetic Resonance Imaging of Healthy Brain Aging: A Review. *NMR in Biomedicine* Article # e4564 (2021), pp. 1–25.
DOI: 10.1002/nbm.4564.

17. Williams, R.J., **MacDonald**, **M.E.**, Mazerole, E.L., and Pike, G.B. The relationship between cognition and cerebrovascular reactivity: Implications for cognitive fMRI. *Frontiers in Physics - Medical Physics and Imaging* 9, Article # 645249 (2021).
DOI: 10.3389/fphy.2021.645249.

16. Rajashekar, D., Wilms, M., **MacDonald**, **M.E.**, Hill, M.D., Dukelow, S.P., and Forkert, N.D. Lesion-symptom mapping with NIHSS sub-scores in ischemic stroke patients. *Stroke & Vascular Neurology* (2021).
DOI: 10.1136/svn-2021-001091.

15. **MacDonald**, **M.E.**, Williams, R.J., Rajashekar, D., Stafford, R.B.S., Hanganu, A., Sun, H., Berman, A.J.L., McCreary, C.M., Frayne, R., Forkert, N.D., and Pike, G.B. The Effect of Aging on Cerebral Blood Flow and Cortical Thickness with Application to Age Prediction. *Neurobiology of Aging* 95 (2020), pp. 131–142.
DOI: 10.1016/j.neurobiolaging.2020.06.019.

14. Lo Vercio, L., Amador, K., Bannister, J., Crites, S., Gutierrez, A., **MacDonald**, **M.E.**, Moore, J., Mouches, P., Rajashekar, D., Schimert, S., Subbanna, N., Tuladhar, A., Wang, N., Wilms, M., Winder, A., and Forkert, N.D. Supervised machine learning tools: a tutorial for clinicians. *Journal of Neural Engineering* 16.6 (2020), p. 062001.
DOI: 10.1088/1741-2552/abbff2.

13. Rajashekar, D., Wilms, M., **MacDonald**, **M.E.**, Ehrhardt, J., Mouches, P., Frayne, R., Hill, M., and Forkert, N.D. High-resolution T2-FLAIR and non-contrast CT brain atlas of the elderly. *Scientific Data* 7.56 (2020).
DOI: 10.1038/s41597-020-0379-9.

12. **MacDonald**, **M.E.**, Williams, R.J., Forkert, N.D., Berman, A.J.L., McCreary, C.R., Frayne, R., and Pike, G.B. Interdatabase Variability of Cortical Thickness Measurements. *Cerebral Cortex* 29.8 (2019), pp. 3282–3293.
DOI: 10.1093/cercor/bhy197.

11. Sun, H., Ma, Y., **MacDonald**, **M.E.**, and Pike, G.B. Whole Head Quantitative Susceptibility Mapping Using a Least-norm Direct Dipole Inversion Method. *Neuroimage* 179 (2018), pp. 166–175.
DOI: 10.1016/j.neuroimage.2018.06.036.

10. **MacDonald**, **M.E.**, Berman, A.J.L., Williams, R.J., Mazerole, E.L., and Pike, G.B. Modelling Hyperoxia-induced BOLD Signal Dynamics to Estimate Cerebral Blood Flow, Volume and Mean Transit Time. *Neuroimage* 178 (2018), pp. 461–474.
DOI: 10.1016/j.neuroimage.2018.05.066.

9. Berman, A.J.L., Mazerolle, E.L., **MacDonald**, **M.E.**, Blockley, N.P., Luh, W., and Pike, G.B. Gas-free Calibrated fMRI with a Correction for Vessel-Size Sensitivity. *NeuroImage* 169 (2018), pp. 176–188.
DOI: 10.1016/j.neuroimage.2017.12.047.

8. **MacDonald**, **M.E.**, Dolati, P., Mitha, A., Wong, J.H., and Frayne, R. Dynamic Phase Contrast Magnetic Resonance Imaging for the Assessment of Arteriovenious Malformation and Aneurysm Pressure. *Magnetic Resonance Imaging* 34 (2016), pp. 1322–1328.
DOI: 10.1016/j.mri.2016.07.007.

7. **MacDonald**, **M.E.**, Forkert, N.D., Pike, G.B., and Frayne, R. Phase Error Correction in Time-Averaged 3D Phase Contrast Magnetic Resonance Imaging of the Cerebral Vasculature. *Public Library of Science ONE* 11.2 (2016), pp. 1–15.
DOI: 10.1371/journal.pone.0149930.

6. **MacDonald**, **M.E.** and Frayne, R. Phase Contrast MR Imaging Measurements of Blood Flow in Healthy Human Cerebral Vessel Segments. *Physiological Measurement* 36.7 (2015), pp. 1517–1527.
DOI: 10.1088/0967-3334/36/7/1517.

5. **MacDonald**, **M.E.** and Frayne, R. Cerebrovascular Magnetic Resonance Imaging: A Review of State-of-the-Art Approaches, Methods and Techniques. *NMR in Biomedicine* 28.7 (2015), pp. 767–791.
DOI: 10.1002/nbm.3322.

4. **MacDonald**, **M.E.**, Dolati, P., Mitha, A., Essa, M., Wong, J.H., and Frayne, R. Flow and Hemodynamic Alteration in a Giant Cerebral Aneurysm Treated with a Pipeline Stent. *Radiology Case Reports* 10.2 (2015), pp. 1–7.
DOI: 10.2484/rcr.v10i2.1109.

3. **MacDonald**, **M.E.**, Stafford, R.B., Yerly, J., Andersen, L., McCreary, C.M., and Frayne, R. Accelerated Passive MR Catheter Tracking into the Carotid Artery of Canines Magnetic Resonance Imaging (2013). Issue: 1 Pages: 120–129 Volume: 31.
DOI: 10.1016/j.mri.2012.06.033.

2. Swailies, N.E., **MacDonald**, **M.E.**, and Frayne, R. Closed-Loop Circulation Phantom with Heart and Lung Motion for Validating Passive Magnetic Resonance Catheter Tracking. *Journal of Magnetic Resonance Imaging* 34.4 (2011), pp. 941–946.
DOI: 10.1002/jmri.22688.

1. **MacDonald**, **M.E.**, Smith, M.R., and Frayne, R. Deconvolution with Simple Extrapolation for Improved CBF Measurements in DSC-MRI during Acute Ischemic Stroke. *Magnetic Resonance Imaging* 29.1 (2011), pp. 620–629.
DOI: 10.1016/j.mri.2011.02.024.

4.3.2. Preprint and Archive Manuscripts (Preprint)

2. Shahidi, F., **MacDonald M.E.** Seitz, D., and Messier, G. The Effect of Epidemiological Cohort Creation on the Machine Learning Prediction of Homelessness and Police Interaction Outcomes Using Administrative Health Care Data. *ArXiv, Computer Science - Machine Learning. arxiv.org/abs/2307.11211* (2023).
DOI: 10.48550/arXiv.2307.11211.

1. Zhang, J, Wan, T, **MacDonald**, **M.E.**, Menon, B, Ganesh, A, and Wu, Q. Synchronous Image-Label Diffusion Probability Model with Application to Stroke Lesion Segmentation on Non-contrast CT. *ArXiv, Computer Science - Computer Vision and Pattern Recognition. arXiv:2307.01740* (2023).
DOI: 10.48550/arXiv.2307.01740.

4.3.3. Peer Reviewed Manuscripts (Accepted)

2. He, J., Antonyan, L., Zhu, H., Li, Q., Enoma, D., Zhang, W., Liu, A., Cao, B., **MacDonald**, **M.E.**, Arnold, P., and Long, Q. A Statistical Method for Image-Mediated Association Studies Discovers Genes and Pathways Associated with Four Brain Disorders. *Accepted to The American Journal of Human Genetics, AJHG-D-23-00437, 2023-08-20* (March 2023).

1. Vega, F., Addeh, A., Ganesh, A., Smith, E.E., and **MacDonald**, **M.E.** Using a 2D General Adversarial Network for Translation of MRI Structural to Amyloid PET. *Accepted to Journal of Magnetic Resonance Imaging, 2023-03-01, JMRI-23-0331* (February 2023).

4.3.4. Peer Reviewed Manuscripts (Submitted)

4. Gianchandani, N., Dibaji, M., Ospel, J., Vega, F., Bento, M., **MacDonald**, **M.E.**, and Souza, R. A Voxel-Level Approach to Brain Age Prediction: A Method to Assess Regional Brain Aging. *Submitted to Imaging Neuroscience, 2023-09-26, IMAG-23-0162* (September 2023).

3. Shahidi, F., **MacDonald M.E.** Seitz, D., and Messier, G. The Effect of Epidemiological Cohort Creation on the Machine Learning Prediction of Homelessness and Police Interaction Outcomes Using Administrative Health Care Data. *Submitted to Frontiers in Public Health, 1238136* (June 2023).

2. **MacDonald**, **M.E.** Measuring Resting Cerebral Perfusion using Magnetic Resonance Imaging. *Submitted to Frontiers in Physiology - Physics and Medical Imaging, 2023-03-31* (March 2023).

1. Wacker, S., Groves, R., Mansuri, A., Mapar, M., Gilliland, R.L., **MacDonald**, **M.E.**, and Lewis, I.A. ms-mint: Targeted Metabolomics with Python. *Submitted to Briefings in Bioinformatics, 2023-02-24, BIB-23-0367* (February 2023).

4.3.5. Conference Proceedings

123. Ardila, K., Munro, E., Mohite, A., Curtis, C., Long, Q., and **MacDonald**, **M.E.** Modelling the Impact of Genetics on the Aging of Cerebral White Matter with Brain Age Gap Estimates using the UK Biobank. *24th Alberta Biomedical Engineering Conference*. Assistant Professor. Banff, Canada, October 2023.

122. Charatpangoon, P., Mohite, A., Vega, F., McDougall, C., Barber, B., Ganesh, A., and **MacDonald**, **M.E.** Brain Age Gap Estimation for Transient Ischemic Attack (TIA) Patients Using Deep Learning Model with T1-weighted Structural MRI. *24th Alberta Biomedical Engineering Conference*. Assistant Professor. Banff, Canada, October 2023.

121. Al-Khoury, Y., **MacDonald**, **M.E.**, and Manske, S. Automatic Segmentation of Bone in Cone Beam CT Images. *24th Alberta Biomedical Engineering Conference*. Assistant Professor. Banff, Canada, October 2023.

120. Charatpangoon, P., Singh, N., Almekhlafi, M.A., Swartz, R.H., Perera, K.S., Carrier, A., Menon, B.K., Ganesh, A, and **MacDonald**, **M.E.** Method to Increase Enrolment Rates in Stroke Clinical Trials Using Automatic Matching Algorithms. *2023 World Stroke Congress*. Oct 10-12, 2023. Submitted. Assistant Professor. Toronto, Canada, October 10, 2023.

119. Gianchandani, N., **MacDonald**, **M.E.**, and Souza, R. A Multitask Deep Learning Model for Voxel-level Brain Age Gap Estimation. *2023 Machine Learning in Medical Imaging (MLMI 2023) - MICCAI*. Oct 8, 2023. Submitted. Assistant Professor. Vancouver, Canada, October 8, 2023.

118. Vega, F., Addeh, A., and **MacDonald**, **M.E.** Estimating Amyloid Beta from Magnetic Resonance Imaging. *Alzhiemer's Society of Alberta and the Northwest Territories - Hope for Tomorrow*. Assistant Professor. Calgary, Canada, September 2023.

117. Hassan, S., Spiian, A., and **MacDonald**, **M.E.** A Computational Approach to Understand the Effect of Lesions in Thalamotomy for Essential Tremor. *University of Calgary, Biomedical Undergraduate Research Symposium*. Assistant Professor. August 2023.

116. Al-Khoury, Y., **MacDonald**, **M.E.**, and Manske, S. Automatic Bone Segmentation of Hand Cone Beam CT Images Using an Edge-based Level-set Method. *University of Calgary, Biomedical Undergraduate Research Symposium*. Assistant Professor. August 2023.

115. Liang, C., Mohite, A., and **MacDonald**, **M.E.** Bias Adjustment in Neuro-Imaging Based Brain Age Gap Estimation. *University of Calgary, Heritage Youth Researcher Summer (HYRS) Program Symposium*. Assistant Professor. August 2023.

114. Wang, S., Ong, A., and **MacDonald**, **M.E.** Investigating Choroid Plexus-Driven Amyloid-Beta Aggregation in Patients with Alzheimer's Disease. *University of Calgary, Heritage Youth Researcher Summer (HYRS) Program Symposium*. Assistant Professor. August 2023.

113. Gianchandani, N., Dibaji, M., Bento, N., **MacDonald**, **M.E.**, and Souza, R. Reframing the Brain Age Prediction Problem to a More Interpretable and Quantitative Approach. *2023 Interpretable Machine Learning in Healthcare*. July 28, 2023. Submitted. Assistant Professor, p 88. Honolulu, Hawaii, July 28, 2023.

112. Addeh, A., Vega, F., Williams, R.J., Pike, G.B., and **MacDonald**, **M.E.** Direct Estimation of Respiratory Variation Waveforms All the Way to the Edge of fMRI Scans. *2023 Annual Organization of Human Brain Mapping*. July 22-26, 2023. Poster. Assistant Professor. Montreal, Canada, July 22, 2023.

111. Vega, F., Addeh, A., and **MacDonald**, **M.E.** Amyloid-Beta PET Synthesis from Structural MRI: A Potential Alternative Method for Alzheimer's Disease Screening. *2023 Alzheimer's Association International Conference*. July 16-20, 2023. Accepted 79258 P01-09. Assistant Professor. Amsterdam, Netherlands, July 16, 2023.

110. Gilliland, R, Ulke-Lemee, A, Valdés-Tresanco, M.E., Westlund, A, Mansuri, A, Hepburn, M, Mortimer, T.D., Smith, J., Pham, T.M., Ramamourthy, G., Plakhotnyk, A., MacKenzie, C., Groves, R., Wacker, S., Rydzak, T., Mapar, M., Walker, B, Gregson, D, Grad, Y.H., Benediktsson, H, Earl, A.M., Lewis, I.A., and **MacDonald**, **M.E.** Microbial Proteomic Traits Contribute to Staphylococcus aureus BSI Patient Mortality. *2023 American Society of Microbiology Microbe*. Assistant Prof., submitted. June 2023.

109. Hepburn, M., Valdes-Tresanco, M.E., Gilliland, R., Westlund, A., Ulke-Lemee, A., Wacker, S., Mansuri, A., G, Ramamourthy, Rydzak, T., Smith, S.T., Plakhotnyk, A., Mackenzie, C., Mapar, M., Walker, B.J., Earl, A.M., Benediktsson, H., Gregson, D.B., **MacDonald**, **M.E.**, and Lewis, I.A. Blood Stream Isolates: What's in a Proteome? *2023 American Society of Mass Spectometry Annual Conference*. June 2023.

108. Lewis, I.A., Gregson, D, Clement, F., Earl, A., Grad, Y.H., Benediktsson, H., Walker, B., and **MacDonald**, **M.E.** Mass spectrometry-guided precision medicine: a new frontier for clinical microbiology. *2023 American Society of Mass Spectometry Annual Conference*. Assistant Prof., submitted. June 2023.

107. Lewis, I.A., Gregson, D, Clement, F., Earl, A., Grad, Y.H., Benediktsson, H., Walker, B., and **MacDonald**, **M.E.** The Calgary BSI Cohort: guiding precision medicine from a 16-year multi-omics survey of infections. *2023 American Society of Microbiology Microbe*. Assistant Prof., submitted. June 2023.

106. MacKenzie, C., Hepburn, M., Mortimer, T.D., Smith, J.T., Valdes-Tresanco, M.E., Ulke-Lemee, A., Ramamourthy, G., Wacker, S., Mapar, M., Rydzak, T., Groves, R., Mansuri, A., Westlund, A., Plakhotnyk, A., Gilliland, R., Pham, T., Walker, B.J., **MacDonald**, **M.E.**, Gregson, D.B., Earl, A.M., Grad, Y.H., Benediktsson, H., and Lewis, I.A. A Genomic and Proteomic Survey of Traits that Modulate Antimicrobial Resistance in Staphylococcus aureus. *2023 American Society of Microbiology Microbe*. Assistant Prof., submitted. June 2023.

105. Plakhotnyk, A., Mortimer, T.D., Valdez-Tresanco, M., Westlund, A., Walker, B., Wacker, S., Ulke-Lemee, A., Mansuri, A., MacKenzie, C., Ramamourthy, G., Ma par, M., Hepburn, M., Rydzak, T., Gregson, D., Pham, T., Grad, Y., Earl, A., Smith, J., Gilliland, R., **MacDonald**, **M.E.**, Hallgrimsson, B., Groves, R., and Lewis, I.A. Prevalence Of Multi-strain Infections In Staphylococcus Aureus Bacteremia: Insights From A City-wide Survey. *2023 American Society of Microbiology Microbe*. Assistant Prof., submitted. June 2023.

104. Ulke-Lemee, A., Valdés-Tresanco, M.E., Gilliland R.and MacKenzie, C., Hepburn, M., Mapar, M., Groves, R., Mansuri, A., Plakhotnyk, A., Ramamourthy, G., Rydzak, T., Wacker, S., Westlund, A., Pham, T.M., Mortimer, T.D., Smith, J.T., Walker, B.J., Earl, A.M., Grad, Y.H., **MacDonald**, **M.E.**, Gregson, D., and Lewis, I.A. Laying The Foundation For Virulence-guided Therapy: Insights From A City-wide Proteomics Survey Of Blood Stream Infections. *2023 American Society of Microbiology Microbe*. Assistant Prof., submitted. June 2023.

103. Westlund, A., Mansuri, A., Gregson, D., Wacker, S., Ulke-Lemee, A., Pham, T.M., Grad, Y.H., Benediktsson, H., Earl, A.M., **MacDonald**, **M.E.**, Walker, B.J., and Lewis, I.A. Outcomes and Antibiotic-Resistance Fluctuates in Rising Blood Stream Infections in Calgary, Alberta over a 16-year period. *2023 American Society of Microbiology Microbe*. Assistant Prof., submitted. June 2023.

102. Addeh, A., Vega, F., and **MacDonald**, **M.E.** Using BOLD-fMRI to Compute Respiration Volume per Time (RVT) and Respiration Variation (RV) with Convolutional Neural Network (CNN) in Children. *2023 Annual International Society of Magnetic Resonance in Medicine Scientific Meeting*. June 3-8, 2023. Digital Poster. Assistant Professor. Toronto, Canada, June 3, 2023.

101. Vega, F., Addeh, A., Elmenshawi, A., and **MacDonald**, **M.E.** Amyloid-Beta Axial Plane PET Synthesis from Structural MRI: An Image Translation Approach for Screening Alzheimer's Disease. *2023 Annual International Society of Magnetic Resonance in Medicine Scientific Meeting*. June 3-8, 2023. Digital Poster. Assistant Professor. Toronto, Canada, June 3, 2023.

100. Vega, F., Addeh, A., and **MacDonald**, **M.E.** Denoising Simulated Low-Field MRI (70mT) using Denoising AutoEncoders (DAE) and Cycle Consistent Generative Adversarial Network (Cycle-GAN). *2023 Annual International Society of Magnetic Resonance in Medicine Scientific Meeting*. June 3-8, 2023. Digital Poster. Assistant Professor. Toronto, Canada, June 3, 2023.

99. Addeh, A., Ardial Lopez, K., Vega, F., Golestani, A., and **MacDonald**, **M.E.** Limitations of the Derived Respiratory Variation Measurements used in Functional Magnetic Resonance Imaging. *2023 IEEE - International Symposium on Biomedical Imaging*. April 18-21, 2023. Accepted. Assistant Professor. Cartagena de Indias, Columbia, April 18, 2023.

98. Ardila, K., Munro, E., Vega, F., Mohite, A., Curtis, C., Tyndall, A.V., and **MacDonald**, **M.E.** Using Machine Learning to Study the Genetic Effects on Brain Aging in the UK Biobank. *2023 IEEE - International Symposium on Biomedical Imaging*. April 18-21, 2023. Accepted. Assistant Professor. Cartagena de Indias, Columbia, April 18, 2023.

97. Bahadoripour, S., **MacDonald**, **M.E.**, and Karimipour, H. A Deep Multi-Modal Cyber-Attack Detection in Industrial Control Systems. *2023 IEEE - International Conference on Industrial Technology*. April 4-6, 2023. Oral. Assistant Professor. Orlando, United States, April 4, 2023.

96. Ardilla, K., Munro, E., and **MacDonald**, **M.E.** Modeling the Impact of Genetics on Brain Aging: Identifying Genetic Associations with Age Gap Estimates using Neuroimaging and Genome Data from the UK Biobank. *2023 Women in Data Science at the University of Calgary*. Assistant Professor. Calgary, Canada, March 2023.

95. Gianchandani, N., **MacDonald**, **M.E.**, and Souza, R. Voxel-wise Brain Age Prediction to Assess Brain Aging using T1-Weighted MRI. *2023 Women in Data Science at the University of Calgary*. Assistant Professor. Calgary, Canada, March 2023.

94. Gilliland, R., Ulke-Lemee, A., Valdes-Tresanco, M.E., Hepburn, M., Groves, R., MacKenzie, C., Mansuri, A., Mapar, M., Plakhotnyk, A., Ramamourthy, G., Rydzak, T., Westlund, A., Pham, T.M., Smith, J.T., Salamzade, R., Wacker, S., Mortimer, T., Walker, B.J., Gregson, D.B., Earl, A.M., Grad, Y.H., **MacDonald**, **M.E.**, and Lewis, I.A. The Diagnostic Relevance of Bloodstream Infection Host Factors. *2023 Large Scale Applied Research Project LSARP Retreat Meeting*. Assistant Professor. Canmore, Canada, March 2023.

93. Mohite, A., Ardilla, K., Munro, E., and **MacDonald**, **M.E.** Comparison of Machine Learning Models for Brain Age Gap Estimation with Few Inputs Features - Developing a Biomarker to Investigate the Role of Genetics in Neurodegeneration. *2023 Women in Data Science at the University of Calgary*. Assistant Professor. Calgary, Canada, March 2023.

92. Addeh, A., Vega, F., and **MacDonald**, **M.E.** Challenges of Respiratory Signals Measurement in fMRI Studies. *23rd Alberta Biomedical Engineering Conference*. Banff, Canada, October 2022.

91. Munro, E., Ardila, K., Mohite, A., Curtis, C., Tyndall, A.V., and **MacDonald**, **M.E.** Using Machine Learning to Discover Genetic Effects on Brain Aging in the UK Biobank. *23rd Alberta Biomedical Engineering Conference*. Assistant Professor. Banff, Canada, October 2022.

90. Osman Jakpa, A., Taib, M., Nguyen, B., **MacDonald**, **M.E.**, and Messier, G. Using Deep Learning and Interpretable AI to Predict Outcomes in Medical Data. *23rd Alberta Biomedical Engineering Conference*. Assistant Professor. Banff, Canada, October 2022.

89. Shahidi, F., **MacDonald**, **M.E.**, and Messier, G. Session-Based Recommender Systems and Hyper Parameter Optimization for Machine Learning of Administrative Data. *23rd Alberta Biomedical Engineering Conference*. Assistant Professor. Banff, Canada, October 2022.

88. Vega, F., Addeh, A., Elmenshawi, A., and **MacDonald**, **M.E.** Towards a Non-invasive Method for Screening Alzheimer's Disease: Image Translation to Estimate Amyloid-Beta Positron from Structural MRI. *23rd Alberta Biomedical Engineering Conference*. Assistant Professor. Banff, Canada, October 2022.

87. Bowron, E., Addeh, A., Elmenshawi, A., Ardila Lopez, K., Medi, P., Mukherjee, S., Munro, E., Vega, F., and **MacDonald**, **M.E.** Research Projects in the BIT Lab. *University of Calgary, Heritage Youth Researcher Summer (HYRS) Program Symposium*. Assistant Professor. August 2022.

86. Elmenshawi, A., Vega, F., and **MacDonald**, **M.E.** Enhancing the Preprocessing Pipeline for Image Translation Models to make Beta-Amyloid Positron Emission Tomography (PET) from Structural Magnetic Resonance Imaging (MRI). *University of Calgary, Biomedical Undergraduate Research Symposium*. Assistant Professor. August 2022.

85. Munro, E., Ardila, K., Mohite, A., Curtis, C., and **MacDonald**, **M.E.** Preliminary Work using Machine Learning to Discover Genetic Effects on Brain Aging in the UK Biobank. *University of Calgary, Biomedical Undergraduate Research Symposium*. Assistant Professor. August 2022.

84. Vega, F., Addeh, A., and **MacDonald**, **M.E.** Preliminary Evidence of Two Dimensional Image Translation to Estimate Beta Amyloid PET from MRI. *30th Brain and Brain PET - ISCBFM Meeting*. #603 (Assistant Professor. Glasgow, Scotland, June 2022.

83. Vega, F., Addeh, A., and **MacDonald**, **M.E.** Preliminary Evidence of Two Dimensional Image Translation to Estimate Beta Amyloid PET from MRI. *Hotchkiss Brain Institute Research Day*. #47 Assistant Professor. May 2022.

82. **MacDonald**, **M.E.**, Fikre, E., Vega, F., and Addeh, A. Simulation Evidence for use of a Denoising Auto-Encoder (DAE) to Improve Ultra-Low Field (64mT) MRI with a High Field (3T) Prior. *31st ISMRM Annual Meeting*. May 7-10, 2022. #1817 (Assistant Professor, e-poster. London, England, May 7, 2022.

81. Williams, R.J., Specht, J., **MacDonald**, **M.E.**, and Pike, G.B. Regional variation in the linear relationship between breath-hold cerebrovascular reactivity and BOLD fMRI activation. *31st ISMRM Annual Meeting*. May 7-10, 2022. #1739 (Assistant Professor, poster. London, England, May 7, 2022.

80. Fikre, E., Menon, B., and **MacDonald**, **M.E.** Convolutional Autoencoder for Denoising Low Dose CT Perfusion Maps. *Canadian Undergraduate Biomedical Engineering Conference - Virtual Conference Organized at University of British Columbia*. Assistant Prof., Virtual Poster Presentation. 2021.

79. Rajashekar, D., Wilms, M., **MacDonald**, **M.E.**, Schimert, S., Hill, M., Goyal, M., Demchuk, A., Dukelow, S., and Forkert, N.D. Lesion-deficit relationships defined using NIHSS sub-scores in acute ischemic stroke patients. *58th American Society of Neuroradiology Annual Meeting May 22-27*. Assistant Professor, e-poster. 2021, p. 514.

78. Addeh, A., Chen, J.J., and **MacDonald**, **M.E.** Reconstruction of Respiratory Volume Signal Variations Using BOLD Signals and Neural Network. *2021 Alberta Biomedical Engineering Conference - Oral Presentation*. PDF., invited oral presentation. October 2021.

77. Wilms, M., Bannister, J.J., Mouches, P., **MacDonald**, **M.E.**, Rajashekar, D., and Forkert, N.D. Bidirectional Modeling and Analysis of Brain Aging with Normalizing Flows. *Machine Learning in Clinical Neuroimaging at MICCAI*. Research Scientist, oral paper presentation. Lima, Peru, October 2020.

76. **MacDonald**, **M.E.**, Scott, S., Liu, W.Q., Zhang, Y., Metz, L., and Pike, G.B. The Impact of Multiple Sclerosis Lesion Tract Burden on the Cortex. *26th OHBM Scientific Meeting*. PDF., poster presentation. Montreal, Canada, June 2020, p. 401.

75. Scott, S., **MacDonald**, **M.E.**, Rajashekar, D., Liu, W.Q., Sun, H., Metz, L., Zhang, Y., and Pike, G.B. A Clustering Analysis of MS Lesions with T1-T2-weighted, Diffusion, QSM, and MTR Imaging. *26th OHBM Scientific Meeting*. PDF., poster presentation. Montreal, Canada, June 2020, p. 286.

74. McLean, M.A., Lebel, R.M., **MacDonald**, **M.E.**, Boudreau, M., and Pike, G.B. Accelerated quantitative magnetization transfer (qMT) imaging using compressed sensing and parallel imaging. *28th ISMRM Scientific Meeting*. PDF., e-poster presentation. Sydney, Australia, April 2020, p. 3137.

73. Sun, H., **MacDonald**, **M.E.**, Lebel, R.M., and Pike, G.B. Simultaneous T1-weighted imaging, R2* mapping, and QSM from a multi-echo MPRAGE sequence using a radial fan-beam sampling scheme at 3 Tesla. *28th ISMRM Scientific Meeting*. PDF., e-poster presentation. Sydney, Australia, April 2020, p. 3207.

72. Liu, W.Q., **MacDonald**, **M.E.**, Pasha, R., Greenfield, J., Cerchiaro, G., Zhang, Y., Yong, V.W., Pike, G.B., and Metz, L.M. Pilot Trial of Domperidone for Remyelination in Relapsing Remitting Multiple Sclerosis. *endMS Conference 2019*. P.D.F., poster presentation. Calgary, Alberta, December 2019.

71. **MacDonald**, **M.E.**, Rajashekar, D., Williams, R.J., Sun, H., McCreary, C.R., Frayne, R., Forkert, N.D., and Pike, G.B. Machine learning methods for age prediction using cortical thickness and cerebral blood flow. *25th OHBM Scientific Meeting*. PDF., poster presentation. Rome, Italy, June 2019, p. 2704.

70. **MacDonald**, **M.E.**, Liu, W.Q., Scott, S., Rockel, C.P., Rajashekar, D., Specht, J.L., Sun, H., and Pike, G.B. White Matter Tract-Defined Lesion Loads in Relapsing-Remitting Multiple Sclerosis. *27th ISMRM Scientific Meeting*. Abstract #3161 (PDF., e-poster presentation. Montreal, Canada, May 2019.

69. Sun, H., **MacDonald**, **M.E.**, Mazerolle, E.L., Sabourin, K., and Pike, G.B. Localization of GPi for MRgFUS pallidotomy: a comparison between high-resolution FGATIR, R2* and QSM at 3 T. *27th ISMRM Scientific Meeting*. Abstract #0800 (PDF., e-poster presentation. Montreal, Canada, May 2019.

68. Williams, R.J., Specht, J., **MacDonald**, **M.E.**, Lebel, R.M., Mazerolle, E.L., and Pike, G.B. Accounting for vascular reactivity to clarify the role of the subcortical regions in attention. *24th OHBM Scientific Meeting*. PDF., poster presentation. Singapore City, Singapore, June 2018, p. 1761.

67. **MacDonald**, **M.E.**, Forkert, N.D., Hanganu, A., Ma, Y., Williams, R.J., Sun, H., Stafford, R., McCreary, C.M., Frayne, R., and Pike, G.B. Cerebrovascular Brain Aging Examined with Arterial Spin Labelling and Applied to Age Prediction. *26th ISMRM Scientific Meeting*. PDF., e-poster presentation. Paris, France, April 2018.

66. Williams, R.J., Mazerolle, E.L., **MacDonald**, **M.E.**, Berman, A.J.L., Luh, W.M., and Pike, G.B. Flow and metabolic coupling associated with positive and negative BOLD responses across retinotopic early visual cortices. *3rd Imaging Cerebral Physiology Symposium, Cardiff, UK*. PDF., poster presentation. June 2017.

65. Berman, A.J.L., Mazerolle, E.L., **MacDonald**, **M.E.**, Blockley, N.P., Luh, W.M., and Pike, G.B. Correcting for imperfect spin echo refocusing in gas-free fMRI calibration. *25th ISMRM Scientific Meeting*. Abstract #1661 (PDF., poster presentation. Honolulu, HI, April 2017.

64. **MacDonald**, **M.E.**, Williams, R.J., Forkert, N.D., Berman, A.J.L., McCreary, C.M., Frayne, R., and Pike, G.B. Consistency of Inter-Database Cortical Thinning with Age. *25th ISMRM Scientific Meeting*. Abstract #0188 (PDF., oral presentation. Honolulu, HI, April 2017.

63. McLean, M.A., **MacDonald**, **M.E.**, Lebel, R.M., Boudreau, M., and Pike, G.B. Accelerated Z-Spectrum Imaging. *25th ISMRM Scientific Meeting*. Abstract #1205 (PDF., oral presentation. Honolulu, HI, April 2017.

62. Sun, H., Ma, Y., **MacDonald**, **M.E.**, and Pike, G.B. Tikhonov regularization aided quantitative susceptibility mapping of whole brain without background field removal. *25th ISMRM Scientific Meeting*. Abstract #3668 (PDF., e-poster presentation. Honolulu, HI, April 2017.

61. **MacDonald**, **M.E.** Dynamic Oxygen Passage Imaging for Perfusion Estimation. *2016 Alberta Imaging Symposium, June 20th*. PDF., invited oral presentation. 2016, p. 18.

60. Sun, H., **MacDonald**, **M.E.**, Ma, Y., and Pike, G.B. Regularization-aided susceptibility inversion without background field removal. *4th Quantitative Susceptibility Mapping Workshop*. PDF., poster presentation. Graz, Austria, September 2016, p. 148.

59. Williams, R.J., Mazerolle, E., **MacDonald**, **M.E.**, Luh, W.M., and Pike, G.B. Positive and negative BOLD and CBF responses across the early visual regions. *22nd Organization of Human Brain Mapping Annual Meeting*. Abstract#:2732 (PDF., poster presentation. Geneva, Switzerland, June 2016.

58. **MacDonald**, **M.E.**, Berman, A.J.L., Williams, R.J., Mazerolle, E.L., and Pike, G.B. Modeling Resting Cerebral Perfusion from BOLD Signal Dynamics During Hyperoxia. *24th ISMRM Scientific Meeting, Singapore City, Republic of Singapore*. PDF., e-poster presentation. May 2016, p. 3831.

57. Sun, H., **MacDonald**, **M.E.**, and Pike, G.B. Phase Correction of a Bipolar Gradient-Echo Acquisition for Quantitative Susceptibility Mapping. *24th ISMRM Scientific Meeting, Singapore City, Republic of Singapore*. PDF., e-poster presentation. May 2016, p. 2987.

56. **MacDonald**, **M.E.**, Berman, A.J.L., Williams, R.J., Mazerolle, E.L., and Pike, G.B. Bold Oxygenation Level Dependence (BOLD) Quantitative Susceptibility Mapping (QSM) at Different Head Orientations. *23rd ISMRM Scientific Meeting*. PDF., poster presentation. Toronto, Canada, June 2015, p. 2120.

55. **MacDonald**, **M.E.**, Forkert, N.D., Pike, G.B., and Frayne, R. The Impact of Phase Errors on Mapping the Flow of the Cerebral Vasculature with Phase Contrast MRI. *21st OHBM Scientific Meeting*. PDF., poster presentation. Honolulu, Hawaii, USA, June 2015, p. 2431.

54. Smith, M.R., Adipour, P., Woehr, J., and **MacDonald**, **M.E.** Overcoming the Image Position-Dependent Resolution Inherent in DFT and CS Reconstructions. *23rd ISMRM Scientific Meeting*. PDF., e-poster presentation. Toronto, Canada, June 2015.

53. **MacDonald**, **M.E.** Imaging Aging with MRI. *NSERC I3T CREATE Seminar Series*. PDF., oral presentation. March 2015.

52. Eilaghi, A., McLean, D.A., Gobbi, D.G., **MacDonald**, **M.E.**, Lauzon, M.L., Salluzzi, M., and Frayne, R. Quantitative Susceptibility Mapping in Human Brain with Normal Aging. *3rd International Workshop on MRI Phase Contrast & Quantitative Susceptibility Mapping, Duke University*. Durham, N.C., USA, October 2014, p. 56.

51. **MacDonald**, **M.E.** and Frayne, R. Comparing Blood Flow on Contralateral Sides of the Brain. *26th International Magnetic Resonance in Angiography Conference*. Ph.D., oral presentation. Rome, Italy, September 2014.

50. Eilaghi, A., McLean, D.A., Gobbi, D.G., **MacDonald**, **M.E.**, Lauzon, M.L., Salluzzi, M., and Frayne, R. Quantitative Susceptibility Mapping in Human Brain with Normal Aging. *7th Annual Molecular and Functional Imaging Symposium*. Ph.D., oral presentation. Ottawa, Ontario, June 2014, p. 24.

49. Eilaghi, A., McLean, D.A., Gobbi, D.G., **MacDonald**, **M.E.**, Lauzon, M.L., Salluzzi, M., and Frayne, R. Characterizing Magnetic Susceptibility Changes in the Human Brain in Normal Aging using Quantitative Susceptibility Mapping. *4th Alberta Imaging Symposium*. Ph.D., oral presentation. Edmonton, AB, June 2014, p. 5.

48. **MacDonald**, **M.E.** and Frayne, R. Blood Flow through the Brain Measured with Phase Contrast MR Imaging. *Department of Radiology Research Day*. Ph.D., invited oral presentation. June 2014.

47. **MacDonald**, **M.E.**, Lauzon, M.L., and Frayne, R. Imaging Battery for Brain Quantification. *4th Alberta Imaging Symposium*. Ph.D., poster presentation. Edmonton, AB, June 2014, p. 6.

46. **MacDonald**, **M.E.**, Dolati, P., Wong, J.H., and Frayne, R. Blood Volume Flow Rates of Vessels in the Healthy Human Cerebral Vasculature. *22nd ISMRM Scientific Meeting*. Ph.D., poster presentation. Milan, Italy, May 2014, p. 1839.

45. **MacDonald**, **M.E.**, Lauzon, M.L., and Frayne, R. Imaging Battery for Brain Quantification. *22nd ISMRM Scientific Meeting*. Ph.D., poster presentation. Milan, Italy, May 2014, p. 1513.

44. **MacDonald**, **M.E.**, Lee, E., Lee, T., Woehr, J., d'Esterre, C., Smith, M.R., and Frayne, R. Dual Compartmental Fitting of Dynamic Susceptibility Contrast MRI in Early Ischemic Stroke. *22nd ISMRM Scientific Meeting*. Ph.D., e-poster presentation. Milan, Italy, May 2014, p. 4601.

43. Smith, M.R., Adibpour, P., Woehr, J., and **MacDonald**, **M.E.** When "To DSP or not to DSP" in the context of Magnetic Resonance Imaging Reconstruction and Analysis. *International and Industrial Imaging Training (I3T) Advanced Imaging Seminar Series*. Ph.D., oral presentation. May 2014.

42. Dolati, P., **MacDonald**, **M.E.**, Wong, J.H., and Frayne, R. Measuring Volume Flow Rates of Cerebral Blood Vessels in Healthy Human Subjects and Arteriovenious Malformations using Phase Contrast MRI. *82nd American Association of Neurological Surgeons*. Ph.D., e-poster. San Francisco, California, April 2014, p. 1104.

41. Dolati, P., **MacDonald**, **M.E.**, Wong, J.H., and Frayne, R. Measuring Volume Flow Rates of Cerebral Blood Vessels in Healthy Human Subjects and Arteriovenious Malformations using Phase Contrast MRI. *Harvard neuroscience meeting*. Ph.D., poster. Cambridge, Massachusetts, March 2014.

40. Eilaghi, A., McLean, D.A., Gobbi, D.G., **MacDonald**, **M.E.**, Lauzon, M.L., Salluzzi, M., and Frayne, R. Susceptibility Changes in Human Brain during Normal Aging using Quantitative Susceptibility Mapping. *12th Imaging Network Ontario Symposium*. Ph.D., oral presentation. Toronto, Ontario, March 2014, p. 13.

39. Kosior, R.K., Mahajan, A., Trevedi, A., **MacDonald**, **M.E.**, Frayne, R., and Barber, P.A. Multimodal Quantitative MR Imaging in Acute Ischemic Stroke: Mapping Tissue Fate. *University of Calgary Leaders in Medicine Research Symposium*. Ph.D., poster presentation. Calgary, AB, November 2013.

38. Lee, E., **MacDonald**, **M.E.**, and Frayne, R. Improving Dynamic Contrast Enhanced MR Perfusion Measurements by Appropriate Selection of Acquisition Parameters. *25th International Workshop on Magnetic Resonance Angiography*. Ph.D., poster presentation. New York, United States, August 2013, p. 154.

37. Lee, E., **MacDonald**, **M.E.**, and Frayne, R. Enhanced Dynamic Contrast Enhanced (DCE) MR for Brain Perfusion Imaging. *4th Canadian Stroke Congress*. Ph.D., poster presentation. Montreal, August 2013, p. 28.

36. **MacDonald**, **M.E.**, Dolati, P., Mitha, A., Wong, J., and Frayne, R. Phase Contrast Magnetic Resonance Imaging in Cerebrovascular Malformations: Towards Pressure Estimation. *25th International Workshop on Magnetic Resonance Angiography*. Ph.D., oral presentation. New York, United States, August 2013, p. 45.

35. Eilaghi, A., **MacDonald**, **M.E.**, McCreary, C.R., Lauzon, M.L., Smith, E.E., Gobbi, D.G., Salluzzi, M., and Frayne, R. Characterization of Cerebral Microbleeds using Quantitative Susceptibility Mapping: Role of Imaging Clinical Trials of Dementia and Small Vessel Disease. *4th Molecular Function and Imaging Symposium*. Ph.D., oral presentation. Ottawa, June 2013, p. 21.

34. **MacDonald**, **M.E.** Phase Contrast in Cerebral Arteriovenious Malformations and Aneurysm. *3rd Alberta Imaging Symposium*. Ph.D., invited oral presentation. Calgary, AB, June 2013.

33. Smith, M.R., Woehr, J., Marasco, E., and **MacDonald**, **M.E.** Impact of DFT Properties on the Inherent Resolution of Compressed Sensing Reconstruction Images 24th Irish Signals and Systems Conference. Ph.D., keynote presentation. Letterkenny, Ireland, June 2013, pp. 1–8.

32. **MacDonald**, **M.E.**, Lebel, R.M., and Frayne, R. Passive Magnetic Resonance Catheter Tracking with Spatial Wavelet and Temporal Constraints. Ph.D., poster presentation. Salt Lake City, United States, April 2013, p. 5232.

31. Lee, E., **MacDonald**, **M.E.**, and Frayne, R. Optimal Repetition Time Ranges for Dynamic Contrast Enhanced T1-weighted Magnetic Resonance Imaging. *13th Alberta Biomedical Engineering Meeting*. Ph.D., oral presentation. Banff, AB, October 2012, p. 60.

30. **MacDonald**, **M.E.**, Menon, B., Dolati, P., Goyal, M., and Frayne, R. Arterial Spin Labeling Applications of Ischemic Stroke. 3rd Canadian Stroke Congress. Ph.D., poster presentation. Calgary, AB, October 2012, pp. 130–130.

29. **MacDonald**, **M.E.**, Dolati, P., Wong, J.H., Leung, T., Nielsen, J., and Frayne, R. Sensitivity of phase-contrast derived velocity and stress fields to receiver bandwidth at the circle of Willis. *24th Annual International Magnetic Resonance Angiography Club Meeting*. Ph.D., oral presentation. Utrecht, Netherlands, September 2012, p. 44.

28. **MacDonald**, **M.E.**, Swailes, N., Smith, M.R., Nielsen, J., and Frayne, R. The Cramer Rao Lower Bound of Magnetic Resonance Phase Image Acquisitions: Comparison with Bayesian Constrained Reconstruction. *Accelerated Magnetic Resonance Imaging 3rd International Workshop*. Ph.D., oral presentation. Freiburg, Germany, September 2012.

27. Swailes, N.E., **MacDonald**, **M.E.**, and Frayne, R. Acquisition and Reconstruction of MR Images for Quantitative Susceptibility Mapping. *4th Seaman Family MR Research Centre Summer Student Symposium, Foothills Medical Centre*. Ph.D., oral presentation. Calgary, AB, August 2012.

26. Adair, D., **MacDonald**, **M.E.**, and Frayne, R. A 3D Real-Time Magnetic Resonance Imaging Application to Visualize Contrast Inflow. *2nd Alberta Imaging Symposium*. Ph.D., poster presentation. Calgary, AB, June 2012.

25. **MacDonald**, **M.E.** Real-Time 3D MRI with Random Undersampling Trajectories to Visualize Endovascular Catheters and Contrast Inflow. 4th Annual Radiology Research Dinner. Ph.D., oral presentation. Calgary, AB, June 2012.

24. **MacDonald**, **M.E.**, Adair, D., Dolati, P., Yerly, J., and Frayne, R. Real-Time 3D MRI with Random Undersampling Trajectories to Visualize Endovascular Catheters and Contrast Inflow. *2nd Alberta Imaging Symposium*. Ph.D., poster presentation. Calgary, AB, June 2012.

23. **MacDonald**, **M.E.**, Dolati, P., Andersen, L.B., McCreary, C.R., Wong, J., and Frayne, R. Measurement of Perfusion during Transient Carotid Occlusion. Ph.D., poster presentation. Calgary AB, June 2012, p. 1026.

22. Beladi, S., McCreary, C.R., Smith, E.E., Lauzon, M.L., **MacDonald**, **M.E.**, and Frayne, R. Quantitative Susceptibility Mapping as an Improved Biomarker for Cerebral Microbleeds in Small Vessel Disease. *20th ISMRM Scientific Meeting*. Ph.D., poster presentation. Melbourne, Australia, May 2012, p. 1027.

21. **MacDonald**, **M.E.**, Adair, D., Dolati, P., Yerly, J., and Frayne, R. Real-Time 3D MRI with Random Undersampling Trajectories to Visualize Endovascular Catheters and Contrast Inflow. *20th ISMRM Scientific Meeting*. Ph.D., poster presentation. Melbourne, Australia, May 2012, p. 2274.
20. **MacDonald**, **M.E.**, Dolati, P., Anderson, L., McCreary, C.R., Wong, J.H., and Frayne, R. Measurement of Perfusion during Transient Carotid Occlusion. *20th ISMRM Scientific Meeting*. Ph.D., poster presentation. Melbourne, Australia, May 2012, p. 1026.
19. Adair, D., **MacDonald**, **M.E.**, and Frayne, R. A 3D Real-Time Magnetic Resonance Imaging Application to Visualize Contrast Inflow. *12th Alberta Biomedical Engineering Meeting*. Ph.D., poster presentation. Banff, AB, October 2011, p. 87.
18. **MacDonald**, **M.E.**, Anderson, L.B., McCreary, C.R., and Frayne, R. Catheter Tracking using Passive Magnetic Resonance Imaging into the Ascending Aorta. *23rd International Magnetic Resonance Angiography Club Meeting*. Ph.D., poster presentation. Banff, AB, Canada, September 2011, p. 158.
17. Smith, M.R., **MacDonald**, **M.E.**, Marasco, E., Salluzzi, M., Gauderon, P., and Frayne, R. Which 1980's and 1990's super-resolution reconstruction ideas would prove useful when 2011's compressed sensing reconstruction is used for MR sparse angiography? *23rd International Magnetic Resonance Angiography Club Meeting*. Ph.D., poster presentation. Banff, AB, Canada, September 2011, p. 141.
16. Adair, D., **MacDonald**, **M.E.**, and Frayne, R. Implementation and Applications of Real-time 3D Magnetic Resonance Imaging. *3rd Seaman Family MR Research Centre Summer Student Symposium, Foothills Medical Centre*. Ph.D., oral presentation. Calgary, AB, August 2011.
15. **MacDonald**, **M.E.**, Lauzon, M.L., Nielsen, J., and Frayne, R. Determining the Cramer Rao Lower Bound of Magnetic Resonance Imaging. *Joint American Association of Medical Physicists (AAPM) and Canadian Organization of Medical Physicists (COMP) Scientific Meeting*. Ph.D., poster presentation. Vancouver, Canada, July 2011, p. 3425.
14. **MacDonald**, **M.E.**, Smith, M.R., and Frayne, R. Improving CBF Image Contrast with Frequency Extrapolation for DSC-MRI during Acute Stroke. *19th ISMRM Scientific Meeting*. Ph.D., poster presentation. Montreal, Canada, May 2011, p. 1976.
13. **MacDonald**, **M.E.**, Swailes, N., Andersen, L.B., McCreary, C.R., and Frayne, R. Guidance to the Branching Vessels of the Aortic Arch with Passive MR Catheter Tracking. *19th ISMRM Scientific Meeting*. Ph.D., poster presentation. Montréal, Canada, May 2011, p. 771.
12. **MacDonald**, **M.E.**, Lauzon, M.L., Nielsen, J., and Frayne, R. Numerical Simulations to Evaluate the CRLB in MRI. *Advanced Imaging Reconstruction Workshop. Natural Sciences and Engineering Research Council (NSERC) Collaborative Research and Training Experience Program (CREATE.* M.Sc., oral presentation. Calgary, AB, April 2011.
11. **MacDonald**, **M.E.**, Swailes, N.E., Stafford, R.B., Andersen, L.B., McCreary, C.R., and Frayne, R. Catheter Tracking using Passive Magnetic Resonance Imaging into the Ascending Aorta. *11th Alberta Biomedical Engineering Meeting*. M.Sc., oral presentation. Banff, AB, October 2010, p. 45.
10. Swailes, N.E., **MacDonald**, **M.E.**, and Frayne, R. Closed-Loop Circulation Phantom with Heart and Lung Motion for Validating Passive Catheter Tracking. *11th Alberta Biomedical Engineering Meeting*. M.Sc., oral presentation. Banff, AB, October 2010, p. 25.
9. Swailes, N.E., **MacDonald**, **M.E.**, and Frayne, R. Circulation Phantom with Closed-Loop Heart and Lung Motion. *2nd Seaman Family MR Research Summer Student Symposium*. M.Sc., oral presentation. Foothills Medical Centre, Calgary, AB, August 2010.
8. **MacDonald**, **M.E.** Real Time Magnetic Resonance Imaging for Passive Catheter Tracking. 2nd Annual Radiology Research Dinner. Place: Calgary, AB. June 2010.
7. **MacDonald**, **M.E.**, Stafford, R.B., Lauzon, M.L., and Frayne, R. One step real-time image correction with GUSTO (Gradient-warp and UnderSampling Transform Operator. *18th ISMRM Scientific Meeting*. M.Sc., poster presentation. Stockholm, Sweden, May 2010, p. 3109.
6. Stafford, R.B., **MacDonald**, **M.E.**, and Frayne, R. Real-Time Gradient Warp Correction with OpenGL NURBS Surfaces. *18th ISMRM Scientific Meeting*. M.Sc., poster presentation. Stockholm, Sweden, May 2010, p. 3110.
5. Sevick, L., **MacDonald**, **M.E.**, Stafford, R.B., Bell, D., and Frayne, R. Portraying Vocalism with Magnetic Resonance Technology. *1st Seaman Family MR Research Summer Student Symposium, Foothills Medical Centre*. M.Sc., oral presentation. Calgary, AB, August 2009.

4. **MacDonald**, **M.E.**, Stafford, R.B., and Frayne, R. Real Time Magnetic Resonance Imaging for Angioplasty. *55th Annual Canadian Organization of Medical Physicists Scientific Conference*. M.Sc., poster presentation. Victoria, BC, July 2009, pp. 84–86.
3. **MacDonald**, **M.E.**, Frayne, R., and Smith, M.R. Extrapolation Methods for Improving MR Perfusion Measurements. *32nd Canadian Medical and Biological Engineering Conference*. M.Sc., oral presentation. Calgary, AB, May 2009, pp. 1–4.
2. **MacDonald**, **M.E.**, Frayne, R., and Smith, M.R. Fourier Domain Extrapolation to Improve Cerebral Blood Flow Accuracy. *9th Alberta Biomedical Engineering Meeting*. B.Sc., oral presentation. Banff, AB, October 2008, p. 40.
1. **MacDonald**, **M.E.**, Frayne, R., and Smith, M.R. Using Fourier Domain Extrapolation to Improve Cerebral Blood Flow Accuracy. *Biomedical Engineering Summer Student Symposium*. B.Sc., oral presentation. University of Calgary BME, Calgary, AB, August 2008.

4.3.6. Theses

3. **MacDonald**, **M.E.** "Quantitative Cerebrovascular Magnetic Resonance Imaging". PhD Thesis. University of Calgary, 2014.
2. **MacDonald**, **M.E.** "Passive Catheter Tracking into the Carotid Artery using Accelerated Magnetic Resonance Imaging". MA thesis. University of Calgary, 2010.
1. **MacDonald**, **M.E.** and Booi, C. "Dynamic Endeavours: A Gyroscopically Stabilized Single Wheel Vehicle". Undergraduate Thesis, Lakehead University, 2008.

5. SKILLS

5.1. Leadership Skills

- Teaching, Pedagogy & Mentorship
- Management and Supervision
- Communication - both verbal and written English; significant experience at writing scientific documents and giving oral presentations

5.2. Computer Skills

- Proficient with Computers - both hardware and software
- Familiar with different operating systems, including: Mac OSX, Windows and Unix
- Expert use of Microsoft Office Word and Excel
- Programming Experience with: MATLAB, C++, C, EPIC (GE MR pulse sequence programming), HTML, Latex, SQL, Qt, ITK, VTK, FreeSurfer, FSL, ANTs, Python, OpenFOAM
- Version Control: CVS, SVN, GIT
- Experience with Cluster Computing, on: SLURM, Torque and PBS

5.3. Lab Skills

- Running MRI scanners (experience with GE Signa and Discovery models)
- Troubleshooting MRI systems
- Electronics Fabrication (design and high reliability soldering certificate)
- Large Animal Handling (certified through the Animal Research Committee at the University of Calgary)

6. SERVICE ACTIVITIES

6.1. University Service

6.1.1. School Service

6.1.1.1 Committees

- July 1, 2021 - July 1, 2022: SSE - Student Recruitment Committee (15-30 hours per year)
- July 1, 2022 - July 1, 2024: SSE - Academic Appeals Committee (15-30 hours per year)
- Feb 3, 2023: Chairing Academic Appeal Deliberations

6.1.2. Departmental Service

6.1.2.1 Task Forces

- Nov 15, 2020 - present: BME curriculum development Electrical Task Force
- Nov 15, 2020 - present: BME curriculum development Design Task Force
- May & June, 2021 - Seaman Centre MR Centre, Software Upgrade Task Force
- Jan 30, 2022 - Mar 15, 2023: BME MEng program development Task Force

6.1.2.2 Committees

- July 1, 2021 - July 1, 2022: Dept. of Electrical and Software Engineering - FGS Scholarship Committee (15-30 hours per year)
- July 1, 2021 - July 1, 2022: Dept. of Electrical and Software Engineering - EDI Committee (15-30 hours per year)
- July 1, 2021 - July 1, 2022: Biomedical Engineering Graduate Program - FGS Scholarship Committee (15-30 hours per year)
- July 1, 2022 - July 1, 2023: Dept. of Biomedical Engineering - EDI Committee (15-30 hours per year)
- July 1, 2023 - July 1, 2024: Dept. of Biomedical Engineering - Research Committee (15-30 hours per year)
- July 1, 2023 - July 1, 2024: Dept. of Biomedical Engineering - Adjunct Review Committee (15-30 hours per year)

6.1.2.3 Academic Search Committees

- Jan 21, 2021 - April 23, 2021 **Hiring Committee** - Electrical and Software Engineering: Next Generation Artificial Intelligence
- March 18, 2021 - April 6, 2021 **Hiring Committee** - Geomagnetic Engineering: wearable technologies
- October 11, 2021 - June 1, 2022 **Hiring Committee** - Biomedical Engineering: Canadian Research Chair in Integrative Biomechanics
- February 28, 2022 - June 1, 2022 **Search Committee** - Department Head for Biomedical Engineering
- October 1, 2022 - May 30, 2023 **Hiring Committee** - Radiology: Canadian Research Chair in Preclinical Imaging
- December 15, 2022 - May 30, 2023 **Hiring Committee** - Biomedical Engineering: Assistant Professor Teaching
- Feb 15, 2023 - May 30, 2023 **Hiring Committee** - Electrical and Software Engineering: Smart Agriculture - 2 positions

6.1.2.4 Other Assignments

- Jan 22, 2021 - present: BME Industry Liaison Officer

6.1.2.5 Internal Grant Reviews

- Sept, 2023 - Departmental Review of Discovery Grant: Emily Rogers-Bradley
- Sept, 2023 - Departmental Review of Discovery Grant: Steve Drew
- Sept, 2023 - Departmental Review of Discovery Grant: Mostafa Farrokhabadi
- Sept, 2023 - Departmental Review of Discovery Grant: Koren Roach

- Sept, 2023 - Departmental Review of Discovery Grant: Salvatore Federico
- Sept, 2023 - Departmental Review of Discovery Grant: Kartik Murari
- Sept, 2022 - Departmental Review of Discovery Grant: Sayeh Bayet
- Sept, 2022 - Departmental Review of Discovery Grant: Ignacio Galiano
- Sept, 2021 - Departmental Review of Discovery Grant: Mariana Bento
- Feb, 2022 - UCalgary Summer Studentship Adjudicator
- Feb, 2023 - UCalgary Summer Studentship Adjudicator

6.2. Professional Service

6.2.1. Grant Review Panels

- Spring, 2022 - Canadian Institutes for Health Research - Reviewer in Training - BME Panel
- 2022 to Present - Editorial Board of "Frontiers in Computational Neuroimaging"
- Fall, 2022 to Spring 2025 - Canadian Institutes for Health Research - Standing Committee Member - BME Panel
- 2022-23 Canada Foundation for Innovation's (CFI) Innovation Fund competition member of an Expert Review Committee (Medical Physics)
- 2023-05 MITACs Accelerate Reviewer

6.2.2. Journal Reviews

Total of 86 journal articles:
- NMR in Biomedicine (5)
- IJDI (2)
- Neurosurgery (3)
- Neuroimage (20)
- The American Journal of Roentgenology (5)
- Journal of Magnetic Resonance Imaging (9)
- Magnetic Resonance in Medicine (9)
- Cerebral Cortex (10)
- Journal of Cerebral Blood Flow and Metabolism (7)
- Magnetic Resonance Imaging (12)
- Stroke (4)

6.2.3. Conference Organization

Conference Organizer 2023

University of Calgary - Transdiscciplinary Scholarhip - 1st Data Science Day
- Was one of five organizers who executed on the event
- Found Speakers for and moderated 25% of the event corresponding to the Schulich School of Engineering component of the event.
- Worked under the lead conference organizer: Nils Forkert

Conference Organizing Assistant 2011

Society for Magnetic Resonance Angiography
- Assisted with conference organization
- Lead social and scientific activites
- Worked under the lead conference organizer: Richard Frayne, PhD

Participated as Peer Reviewer
- Reviewed over 250 abstracts for multiple years at ISMRM meeting
- Reviewed over 100 abstracts for multiple years at OHBM meeting
- Reviewed 23 abstracts for the Alberta Biomedical Engineering Conference
- Reviewed over 200 abstracts submissions for the International MRA Conference
- Named Reviewer for the International Journal of Diagnostic Imaging

6.3. Public Service

Kitchen Volunteer & Server **2019 to present**

Calgary Drop in & Rehab Centre
- Preparing and serving meals for those in need at the Drop in Centre
- Organizing and working with a new team each time

Fund Raiser **2010 to present**

Movember and Heart and Stroke Foundation
- Raising funds for charity
- Raising public awareness through fund raising

Director of Home Owner Association

- Board Member for association with 220 households
- Managing Operating budget of $1.3 M per year
- Resolving conflicts between residents

Leading Fund Raising Activities

- Assisted with Calgary Zone Ski Patrol Ski Sale Fund-raiser, Revenue of: $1.2 M in
- Organized a team for Movember fund-raising, which raised over $5000 in 2010
- Actively learning from other experienced fund raising leaders

Scientific Outreach

- City of Calgary Science Fair Judge 2009&10
- Tours of the MR Centre for High School and Undergraduate students
- Volunteer and tour leader at Discovery Days
- Liaison for Electrical Engineering at University of Calgary Campus Fair

7. OTHER ACTIVITIES

7.1. Hobbies

Skiing, Golf, Recreational Sports, Kung Fu, Investing, Reading, Writing, Engineering, Math, Physics, Photography, Imaging

Ski Instructor **2000 to present**

Martock/ Loch Lommond/C.O.P.
- Ski Instructor certified through the Canadian Ski Instructors Alliance
- Taught skiing in Windsor, NS; Thunder Bay, ON; and Calgary, AB
- Lead personal development sessions for other instructors to improve pedagogy skills

Ski Patroller **2005 to present**

Canadian Ski Patrol
- Patrolled in Scotia, Superior, Kootenay, Southern Alberta, and Calgary Zones
- Trained for emergency medical response in an alpine setting
- Instructor for ski improvement in the Calgary Zone