

4809 Rue du Pilet  
St-Augustin-de-Desmaures  
Québec, G3A 2A1, Canada  
Eric.bharucha.1@ulaval.ca  
Cell (581) 928-6152

*I solve impossible problems that others can't because I understand the full stack - from physics to biology to electronics through systems.*

### QUANTIFIED RESULTS

- Resolved 11-year offshore robotics failure saving \$75M+ in industry losses
- Improved medical implant battery life by 2,200% (4 months → 7.4 years)
- Led Olympus R&D teams developing commercial inspection instrumentation
- Managed 30+ person engineering teams through complex product cycles
- 10+ granted patents 20+ publications in medical devices, aerospace, and power electronics
- Fixed critical space electronics failure after orbital mission catastrophe
- Solved global product recalls affecting thousands of units
- Transformed academic prototypes into FDA-approved commercial devices

### KEY EXPERTISE

- Medical Device Development & Regulatory Compliance (FDA/CE pathways)
- Electronic System Failure Analysis & Forensic Investigation
- Silicon Photonics & Advanced Sensor System Integration
- Neuromodulation & Implantable Device Design (Boston Scientific, St. Jude)
- Crisis Problem Resolution & Complex System Troubleshooting
- Patent Development & Intellectual Property Analysis
- Aerospace Electronics & Environmental Testing (Space-qualified systems)
- Manufacturing Transfer & Quality Control Systems
- Low-Power Electronics & AI Hardware Architecture
- Multidisciplinary Systems Engineering (Physics + Biology + Electronics)

### EDUCATION

- Ph.D Electrical Engineering (ABD) - Université Laval, 2025
- M.Sc. Electrical Engineering - Université Laval, 2020
- B.Eng. Electrical Engineering - McGill University, 1999
- B.Sc. Microbiology & Molecular Biology - Université Laval, 2003
- 600+ university credits across engineering, sciences, medicine

## KEY EDUCATION DETAILS

**Université Laval, Quebec**

2025 (ABD)

***Doctorate Electrical & Computer Engineering and Physics***

- Specializing in memristor based AI technology, machine learning, silicon photonics, microelectronics, low power and low energy systems and applied materials. Additional graduate studies and work at University of British Columbia, M.I.T. & Harvard.

**Université Laval, Quebec**

2020

***Masters Electrical & Computer Engineering***

- Specializations in microelectronics design, micropower electronics and instrumentation. With applications in power electronics and biomedical engineering. Patents and publication stream pending from this work.

**Université Laval, Quebec**

2003

***Bachelors Microbiology and Molecular biology***

- Specializations in medicine and pharmacology with several supplemental courses in chemistry, biochemistry and molecular biology.

**McGill University, Montreal**

1999

***Bachelors Electrical & Computer Engineering & Minor Biotech***

- Specializations in robotics and control, micro-electronics and embedded systems
- Minor in Biotechnology (additional 60+credits)

**WORK EXPERIENCE**

**Université Laval, Québec**  
***Technical Director Sentinel North Instrumentation***

**2017-2025**

**Full stack engineering & Management**

- Sentinel North was a research chair position in multidisciplinary science and engineering.
- Work involved design, start-up, development and technology of various instrumented platforms of the program.
- Participation in numerous research projects with an important contribution of 50+ projects, such as Fourier interference microscopes, remote harsh environment systems, buoys, robotics and cryogenic temperature instruments papers and patents pending.



**Olympus NDT Québec City & Boston MA**  
***R&D Supervisor, Lead Electrical Engineering Group, Head of Quality/Certification Group***

**2013-2017**

**Management aspect**

- Multidisciplinary International and interdepartmental coordination
- Management with weekly follow-up of a design group in Electrical Engineering, Software Engineering, Mechanical Engineering and Physics Engineering
- Daily management of a design and test group in electrical engineering.
- Management of interactions between different disciplines to achieve system specifications.
- Definition of interfaces between physical disciplines, electrical engineering, mechanical engineering, embedded software, software.
- Development of low-level embedded software in order to guarantee the operation of the hardware and ensure the operation of the electronics with its embedded software.
- Problem solving / technical impasses and management of target teams.
- Use of the stage gate process Milestones and Gates.
- Use of Lean methods.
- Burn chart risk management and FMEA (Failure Mode and Effect Analysis).
- Validation and Verification
- Manufacturing transfer
- Complex customer problem resolution
- Management of environmental tests, electrical safety and EMI. Applications of international standards MIL-STD810G, EMC/EMIIEC 61326 FCC and ICES Canada, IP, Mechanical IEC61010 UL/CSA, CE Marking

**Technical aspect**

- Technical lead for projects and product development.
- R&D electronic engineering.
- Debugging of complex problems and customer complaints, analog, FPGA, embedded software, noise, and other complex multifactorial issues.
- Management of a technical team.
- Developed inspection instrumentation.
- Development of certification and validation tests. Design of automated test benches
- Certification, certification tests and certification reports

**Private Consultation - Worldwide****2011-  
PRESENT*****Full stack product development, complex problem resolution***

- Worked on contracts for a dozen clients:
  - energy harvesting;
- Low energy telemetry
- IoT sensors,
- Systems engineering issues,
- Aerospace problem resolution
- Electro-Optics design,
- Medical Devices,
- Robotics sensor system
- Automated instrumentation
- Packaging of microelectronics, photonics and systems

**NEUROSTREAM**  
TECHNOLOGIES**Boston  
Scientific**  
*Delivering what's next.™* **ST. JUDE MEDICAL**  
MORE CONTROL. LESS RISK.**Neurostream Technologies (formerly Victhom Human Bionics) 2004-2012  
St-Augustin QC****Lead Electrical Engineer, systems engineering, Biomedical  
Engineering, Production engineering, R&D**

- R&D electronic engineering and biomedical engineering.
- Management of a design and production team (30+ people)
- Implant design (8 devices)
- Design of automatic production test bench (30 systems)
- Systems engineering
- Design of low power systems
- Design of embedded digital circuits and programmable logic (VHDL)
- Highly sensitive analog circuit design with noise considerations.
- Miniaturization of very high density CSP, flipchip and wirebond and die stack with

interposers.

- Design electronic circuits related to bionics.
- Drafting of contracts with external subcontractors
- Build, start and test prototypes
- Manufacturing transfer
- External contracts with St-Jude Medical (2005-2006) and (Guidant) Boston Scientific (2006)



**Université Laval, Québec**

**2003**

***Research Assistant Long-Distance PCR***

- Optimize a 16kbp long distance PCR (Polymerase Chain Reaction) protocol.
- Perform experiments and perfect a protocol.
- Transfer new protocols to graduate students.



**Louisville KY, Collaboration with NASA Houston, Pasadena, Cape Canaveral, USA. DARPA Funding. 1999-2004**



**Project Engineer**



- Design a robotic molecular analysis system
- Miniaturize the system by a factor of 10 compared to similar systems in existence.
- Designing the electronics of integrated systems for robotic control continued...
- Design robotic systems and mechanisms
- Design electro-optical systems
- Design micro-hydraulic systems
- Design multilayer PCBs
- Design and supervise the computer programming of the robot
- Supervise experimental work in molecular biology
- Act as a mediator between a group of scientists and engineers.
- Build, start and test prototypes



**Department of Biochemistry Louisville University KY USA**  
***Research Assistant***

2001

- Analyze protein samples for enzyme activity by radioisotope methods.
- Write a scientific paper and have it published



**Department of Biomedical Engineering McGill, Montréal**  
***Research assistant***

1996-1999

- Design and build electronic systems
- Assist mechanical design
- Develop computer systems
- Install new equipment
- Develop DSP (Digital Signal Processing) algorithms and system identification.



**Department of Electrical engineering McGill University, Montréal**  
***Teaching Assistant***

1997-1998

- Teach prototype design of microprocessor-based embedded systems
- Teaching the use of CAD (Computer Aided Design) software
- Assist the process of debugging circuits and algorithms



**Department of Physiology McGill University, Montréal**  
***Assistant de recherche***

1994-1995

- Conceptualize and realize laboratory devices
- Install and validate a computerized data acquisition system



**Faculty of medicine Université Laval, Québec**  
***Lab technician***

1995

- Prepare blood samples for molecular analysis
- Perform molecular analyzes

1995-1996



**Team Northern Sun McGill University, Montréal**  
**Engineering student**

- Design electrical power systems on a solar powered vehicle
- Design telemetry system for a 3000km race
- Assemble vehicle components in Australia
- Participate in a world-class race in Australia

#### RESEARCH INTERESTS

- Electronics engineering
- Biomedical engineering
- Aerospace engineering
- Electro-optical engineering & Silicon Photonics
- Complex Instrumentation
- Renewable power electronics
- Full Stack Product development
- Systems engineering
- Manufacturing transfer
- Ultra-Efficiency systems

#### LANGUAGES SPOKEN

- Fluency in French and English
- Basic in Spanish and German

#### PUBLICATIONS & PATENTS

**20+ peer-reviewed publications in biomedical engineering, power electronics, and advanced instrumentation - 7+ publications under review/accepted for 2025 (memristors, biomedical safety, power regulation) - 10+ granted patents across medical devices, electronics, and advanced systems - Active research in AI hardware, biomedical circuits, and safety-critical systems**

##### **PORTABLE PHASE ARRAY INSTRUMENT**

Patent number: 10890565

Type: Grant

Filed: June 19, 2018

Date of Patent: January 12, 2021

Assignee: Olympus America Inc.

Inventors: Benjamin Spay, Francois Houde, Christian Gauvin, Jean-Sebastien Langlois, Eric Bharucha

**ELECTRONIC TORQUE METER DESIGNED TO MEASURE AND SEND READING DATA OVER A WIRELESS INTERFACE AND SYSTEM INCLUDING SAID TORQUE METER**

Publication number: 20220241942

Type: Application

Filed: June 15, 2020

Publication date: August 4, 2022

Inventors: Alberto BLAY, Younès MESSADDEQ, Eric BHARUCHA

**IMPLANTABLE PULSE GENERATOR**

Type: Grant

Patent number: 8588927

Filed: October 9, 2007

Date of Patent: November 19, 2013

Assignee: Neurostream Technologies General Partnership

Inventors: Yves Roy, Eric Bharucha

**FREE SPACE FORCE FEEDBACK SYSTEM**

Patent number: 10101157

Type: Grant

Filed: September 14, 2015

Date of Patent: October 16, 2018

Inventors: Eric Bharucha, Simon Tremblay

**MULTIFUNCTIONAL MOTORIZED BOX AND LANDING PAD FOR AUTOMATIC DRONE PACKAGE DELIVERY**

Patent number: 10377507

Type: Grant

Filed: June 11, 2016

Date of Patent: August 13, 2019

Inventors: Simon Tremblay, Eric Bharucha

**REGULATOR CIRCUIT WITH MULTIPLE LEVELS ('Waterfall' Regulator)**

Type: Application

Application number: 63/367,406

Filed: June 30, 2022

Date of Patent: Pat.pending

Assignee: Eric Bharucha

Inventors: Eric Bharucha, Benoit Gosselin

**CELLULAR BEHAVIOR MONITORING DEVICE AND METHOD FOR MONITORING CHANGES IN CELLULAR BEHAVIOR**

Type: Application:Grant

Patent number:11365386

Filed: May 3, 2019

Date of Patent: June 21,2022

Assignee: Université Laval

Inventors: Jacques Corbeil, Younès Messaddeq,Eric Bharucha, Benoit Gosselin

**ELECTRIC PROJECTION WEAPON SYSTEM**

Type: Grant

Patent number : 10488147

Filed: January 16, 2017

Date of Patent: November 26, 2019

Inventors: Simon Tremblay, Eric Bharucha

**Publications (sampling):**

- 1 Bharucha, E., Messaddeq, Y., Gosselin, B. "Waterfall Regulators: A New Topology for Power Electronics" Under Review (2025)
- 2 Bharucha, E., Messaddeq, Y., Gosselin, B. "Practical Experiments with Ultra-Low Voltage Biomedical Amplifiers" IEEE EMBS Conference, Copenhagen, Denmark, July 2025 (Accepted)
- 3 Bharucha, E., Ross, F., Labranche, P., Tremblay, P-A., Landry, J.-T., Paquin, S., Demers, M., Dorval, J.-S., Gauvin, R., Bonenfant, J.-F., Trudeau, J.-M., Babin, M., Tremblay, S., Messaddeq, Y. "Design and Testing of an Ice Endoscope Based on Controlled Melting for Remote Sea Ice Applications" IEEE Transactions on Instrumentation and Measurement (Final Submission 2025)
- 4 Bharucha, E., Messaddeq, Y., Gosselin, B. "Electrical Bio-Stimulation: Practical Safety for Circuits in Clinical Use" ICECS Conference, Marrakech, Morocco (Under Review 2025)
- 5 Bharucha, E., Messaddeq, Y., Gosselin, B. "Biomimetic Target Tracking Systems Based on Memristor Neural Circuits" (Under Review 2025)
- 6 Bharucha, E., Messaddeq, Y., Gosselin, B. "Practical Applications of Memristor-Based Neuromimetic Analog Computing" (Under Review 2025)
- 7 Bharucha, E., Delarosbil, J.-L., Messaddeq, Y. "Simple Fabrication Process for Practical Memristor Chips for Experimentation" (In Preparation 2025)
- 8 Khan, M.Y., Celaschi, S., de Almeida Santos, T.E., Tayama, G.T., Bharucha, É., and Messaddeq, Y.: 'PtOEP Oxygen Sensitive Fluorescent Sensor Through Fiber Optic Bundles', in Editor (Ed.)^(Eds.): 'Book PtOEP Oxygen Sensitive Fluorescent Sensor Through Fiber Optic Bundles' (IEEE, 2024, edn.), pp. 1-2
- 9 Bolduc, D., Fauteux, D., Bharucha, É., Trudeau, J.-M., and Legagneux, P.: 'Ultra-light photosensor collars to monitor Arctic lemming activity', Animal Biotelemetry, 2022, 10, (1), pp. 31
- 10 Gagné-Landmann, A.L.L., St-Onge, J., Deck, K., Massoud, E.C., Bharucha, E., Huntzinger, D.N., Fisher, J., Messaddeq, Y., and Schneider, T.: 'Reducing Uncertainty in Future Projections of CO2 and Net Ecosystem Exchange', in Editor (Ed.)^(Eds.): 'Book Reducing Uncertainty in Future Projections of CO2 and Net Ecosystem Exchange' (2020, edn.), pp. B019-0008

- 11 Das, P.S., Gagnon-Turcotte, G., Ouazaa, K., Bouzid, K., Hosseini, S.N., Bharucha, E., Tremblay, D., Moineau, S., Messaddeq, Y., and Corbeil, J.: 'The ecochip 2: An autonomous sensor platform for multimodal bio-environmental monitoring of the northern habitat', in Editor (Ed.)^(Eds.): 'Book The ecochip 2: An autonomous sensor platform for multimodal bio-environmental monitoring of the northern habitat' (IEEE, 2020, edn.), pp. 4101-4104
- 12 Bharucha, E., Gosselin, B., and Lellouche, F.: 'A long-lifetime, low-cost self-tuning patch oximeter for ventilation therapy', in Editor (Ed.)^(Eds.): 'Book A long-lifetime, low-cost self-tuning patch oximeter for ventilation therapy' (IEEE, 2020, edn.), pp. 327-330
- 13 TREMBLAY, S., and Bharucha, E.: 'Multifunctional motorized box and landing pad for automatic drone package delivery', in Editor (Ed.)^(Eds.): 'Book Multifunctional motorized box and landing pad for automatic drone package delivery' (US Patent App. 16/516,765, 2019, edn.),
- 14 Babin, M., Lambert Girard, S., Katlein, C., Alikacem, Y., Raphaël, L., Perron, C., Trudeau, J.-M., Bharucha, É., and Bécu, G.: 'A multimodal endoscopic approach for characterizing sea-ice optics, physics, biology and biogeochemistry at small scale', in Editor (Ed.)^(Eds.): 'Book A multimodal endoscopic approach for characterizing sea-ice optics, physics, biology and biogeochemistry at small scale' (2019, edn.),
- 15 Tremblay, D., Gosselin, B., Morency, S., Faucher, F., Sarrazin, D., Moineau, S., Corbeil, J., Sylvain, M., Messaddeq, Y., and Allard, M.: 'The EcoChip: a wireless multi-sensor platform for comprehensive environmental monitoring', 2018
- 16 Sylvain, M., Lehoux, F., Morency, S., Faucher, F., Bharucha, E., Tremblay, D.M., Raymond, F., Sarrazin, D., Moineau, S., and Allard, M.: 'The EcoChip: A wireless multi-sensor platform for comprehensive environmental monitoring', IEEE transactions on biomedical circuits and systems, 2018, 12, (6), pp. 1289-1300
- 17 de Faria, R., Iden, H., Bharucha, E., Lins, V., Messaddeq, Y., Matencio, T., and Heneine, L.: 'A new tool for the detection of horsemeat adulteration in raw meat', J. Biosens. Bioelectron., 2018, 9, pp. 264
- 18 Bharucha, E., Sepehrian, H., and Gosselin, B.: 'A survey of neural front end amplifiers and their requirements toward practical neural interfaces', Journal of Low Power Electronics and Applications, 2014, 4, (4), pp. 268-291
- 19 Mounaim, F., Laaziri, Y., Lesbros, G., Nadeau, P., Bharucha, E., Sawan, M., and Bedard, S.: 'Implantable neurostimulator for bladder rehabilitation in paraplegics', in Editor (Ed.)^(Eds.): 'Book Implantable neurostimulator for bladder rehabilitation in paraplegics' (2005, edn.),
- 20 Xue, J., Li, G., Bharucha, E., and Cooper, N.G.: 'Developmentally regulated expression of CaMKII and iGluRs in the rat retina', Developmental brain research, 2002, 138, (1), pp. 61-70

**PERSONAL INTEREST**

- Scuba diving PADI Advanced diver 2007 Level I 2008 Level II Advanced
- Aircraft piloting Certified Medical Class 1 (Commercial rated) Transport Canada certified.
- Adventure travel: The Amazon, Jungles of India, the Australian outback, hikes in Corsica, the Galapagos Islands etc.
- Volunteer work: Terry Fox Run, Canada Science Fair, School activities
- Hiking, jogging, calisthenics.

**PROFESSIONAL AFFILIATIONS**

- IEEE (*Institute of Electrical and Electronics Engineers*)
- SPIE (*The International Society for Optical Engineers*)
- Ordre des Ingénieurs du Québec

**SECURITY CLEARANCE**

- Security clearance possible & obtained in the past