Pierre Boulanger, Ph.D., P.Eng.
Professor

Version January 2026

University of Alberta
Department of Computing Science

2-21 Athabasca Hall
Edmonton, Alberta
Canada T6G 2E8
Tel:(780) 492-3031
Mobile: (780)709-1260
Fax:(780) 492-1071
Web: https://webdocs.cs.ualberta.ca/~pierreb
email: pierreb@ualberta.ca

Date of Birth: 24 April 1957
Citizenship: Canadian

University Education

- **Ph.D. in Electrical Engineering (1994)**, University of Montréal (École Polytechnique), Canada, Department of Electrical and Computer Engineering, advisor Prof. P. Cohen.
  Dissertation: *Multiscale Extraction of Geometric Elements*

- **M.Sc. in Physics (1982)**, Laval University, Québec City, Canada, Department of Physics, advisor Prof. M. Baril.
  Dissertation: *Design of a New Multi-passage Mass Spectrometer*

- **B.Sc. in Engineering Physics (1980)**, Laval University, Québec City, Canada, Department of Engineering Physics.
  Final Year Project: *Design and Construction of a Multi-Channel Analyzer for an Electron Spectrometer*

Specialties

Three-Dimensional Computer Vision, Quantum Computing, Neural Networks, Tele-Immersion, CAD Systems, Non-linear Systems, Physical Simulation, Geometrical Modeling, Reverse Engineering, Medical Imaging, Multimedia Systems, Medical Simulation, and Virtual and Augmented Realities

Work experience

- **University of Alberta**
  - **Department of Computing Science**
  - Dates: January 1, 2025 to today
  - Position: Emeritus Professor
  - Duties: Conduct advanced research spanning quantum image processing, medical AI applications, and geometry-aware neural network architectures.

- Main Research Focus: Pioneer next-generation geometry-aware neural networks with geometric reasoning embedded directly in their architecture, enabling more natural processing of spatial and structural information than conventional methods. This work has transformative potential for medical imaging, computer vision, and 3D reconstruction, achieving superior generalization from limited data through the integration of geometric priors and manifold learning principles. In parallel, quantum image processing research is advanced by leveraging quantum manifolds for novel computational approaches, exploring how quantum mechanical principles can exponentially improve processing speed and analytical capability for complex visual data.

- **Department of Diagnostic Imaging and Radiology**
- Dates: July 1st, 2008 to today
- Position: Adjunct Professor
- Duties: Conduct research and supervise graduate students in collaboration with members of the Radiology Department.
- Main Research Focus: Multiview ultrasound, modulality fusion to create preoperative models, and microwave tomography for the detection of breast cancer.

- **Department of Computing Science**
- Dates: July 1st, 2005 to December 31, 2024
- Position: Professor
- Duties: Teaching, research, and supervising graduate students
- Main Research Focus: I have three main research foci: Quantum Machine Learning, Medical Imaging, Remote Medical Monitoring, and AR/VR for Medical Training and Surgical Planning.

- **Department of Computing Science**
- Dates: July 1st, 2001 to 2004
- Position: Associate Professor
- Duties: Teaching, research, and supervision of graduate students

- **Robosonica Inc.**
  - Dates: December 1, 2025 to Present
  - Position: Chief Technology Officer (CTO)
  - Duties: Lead all R&D activities at Robosonica, advancing the commercialization of robotic-assisted echocardiography technology to enhance operator ergonomics, patient safety, and imaging quality. Spearhead funding initiatives to fuel company growth.
  - Website: Not yet as it is a new start-up
- **Naiad Lab Inc.**
  - Dates: April 2, 2020 to Present
  - Position: Chief Technology Officer (CTO)

- Duties: Naiad Lab Inc. is a reboot of MedROAD Inc. and was incorporated on April 2, 2020, in Edmonton Alberta. My role in Naiad Lab., as the CTO, is to supervise the R&D activities and getting funding for the company.
- Website: http://naiadlab.com

- **SERVIER Virtual Cardiac Center**
  - Dates: July 1st, 2008 to Present
  - Position: Scientific Director
  - Duties: The objective of the SERVIER Virtual Cardiac Center (SVCC) is to develop advanced technologies within the Alberta health care system for the visualization and processing of 3-D and 4-D multimodal imaging data for applications in diagnostics and surgical planning. My role as the scientific director is to establish research objectives for the center and to develop the infrastructure necessary to reach those objectives. I also supervise medical and CS students working in the lab.
  - Website: http://spaces.facsci.ualberta.ca/svcc/

- **Expert Witness for the McCarthy Tetrault Law Firm**
  - Dates: April 1, 2015 to October 2017
  - Position: Expert witness for a software copy-write infringement
  - Duties: Analyze and compare two large computer-aided software programs to determine if one of them was infringing on a copy-write agreement between the companies. The job consisted of analyzing the two software packages of 1.5 million lines of code using software engineering tools. It also required me to appear in court to discuss my finding. In the end, the judge agreed with my opinion and dismissed the case.

- **Laboratory of the Advanced Human-Computer Interface (AHCI)**
  - Dates: July 1st, 2002 to December 31, 2025
  - Position: Director
  - Duties: The AHCI laboratory research activity centers on the development of new man-machine interfaces that allow computer systems to enhance human abilities by adapting to their needs, and our primary focus is on medical applications. As director, I am responsible for the general administration of the laboratory, funding, and the establishment of strategic research directions. The laboratory consists of 15 graduate students and has more than $1.5M of state-of-the-art multimedia equipment.
  - Website: http://spaces.facsci.ualberta.ca/ahci/

- **CISCO Systems Research Chair in Health Care**
  - Dates: August 1st, 2013 to March 1st, 2022
  - Position: Chair Director
  - Duties: In 2013, I was awarded the CISCO Chair in Healthcare Solutions, a two-million-dollar investment by CISCO Systems to advance IT technologies for healthcare in Canada. The Chair's objectives are to improve wellness, healthcare, and clinical sciences

through state-of-the-art information technologies; drive transformative changes across the healthcare system from an end-to-end perspective; and accelerate effective technology transfer to strengthen IT adoption in healthcare. Responsible for setting the Chair's scientific direction and managing all associated activities.

- **Proteus Consulting Inc.**
  - Dates: July 1st, 2001 to January 1, 2020
  - Position: President
  - Duties: I was the president of PROTEUS Consulting Inc., an Alberta-based consulting firm specializing in Virtual Reality Applications. The main goal of this company was to offer consulting services in all aspects of VR and AR technologies, including training.
- **TRlabs**
  - **Free-viewpoint TV (FTV) project**
  - Dates: October 2011 to 2014
  - Position: Principle investigator
  - Duties: The objective of this project was to develop, in collaboration with TRLabs, Telus, HP, and ISB, a first prototype of an FTV using IPTV technology. My role was to conduct research, coordinate activities, and establish strategic research directions.
  - **Pan Western Initiative in New Media**
  - Dates: November 2003 to November 2006
  - Position: Adjunct scientist
  - Duties: Do research in New Media with partners of the TRLabs network. To help TRLabs define and create a $64 M Pan Western Initiative in New Media that included UofA, UofC, SFU, Banff Center, TRLabs network, and Red River College.
- **Digital Light and Sound (DLS)**
  - Dates: May 2001 to September 2003
  - Position: Director of Research
  - Duties: To direct the development of the next generation of DLS products and to be DLS main R&D representative.
- **National Research Council of Canada**
  - Dates: March 1984 to July 1st, 2001
  - Position: Senior Research Officer
  - Duties: Conducted advanced research in nonlinear computer vision, geometric modeling, and virtualized reality systems, specializing in real-time sensor fusion for dynamic virtualized reality models. Managed project coordination, scientific research, laboratory operations, industry technology transfer, and publications as Principal Investigator of the NRC Virtualized Reality Laboratory.

- **Bausch and Lomb Ltd., Ottawa**
  - Dates: March 1982 to March 1984
  - Position: Research Engineer
  - Duties: Design and implementation of a new conical scanning electron lens for wafer inspection.
- **Miscellaneous**
  - General Chair of the 2017 AI/GI/CRV conferences
  - Principle Investigator of the Sensory Motor Adaptive Rehabilitation Technology (SMART) Network (2017-present)
  - Chair of the CAC 2015 Conference Workshop: 3D Scanning for Conservators
  - Organizer of the symposium on Nonlinear Material Characterization using Inverse Simulation Methods at the 2013 Conference on Nonlinear Solid Mechanics
  - Honorific Professor at the National University of Colombia (2011-present)
  - Member of the CIHR College of Reviewers (2016-present)
  - Member of the Killam Prize selection committee 2010-2013
  - Conference Chair of Smart Graphics 2010
  - Track Chair of International Conference on Pattern Recognition 2010
  - Track Chair of International Conference on Pattern Recognition 2008
  - Organizer of the First International Conference on Virtual Rehabilitation: Visioning the Art of the Possible, Edmonton, Alberta, Canada, May 27th, 2005
  - Member of the European Network of Excellence on Virtual and Augmented Reality, September 2003 to 2006
  - Academic member of Vancouver New Media Institute (NewMic), December 2002 to 2003
  - Adjunct scientist/artist at the Banff Centre New Media Institute, April 2003 to 2006
  - Chairman and founder of the Canadian Working Group on Virtualized Reality, April 1998 to 2004
  - Adjunct professor at Laval University Department of Electrical Engineering (2003-2008)
  - Adjunct professor at the Department of Industrial Automation at École des technologies supérieurs in Montréal (2000-2004)
  - Adjunct professor at the Department of Electrical Engineering at the University of Ottawa, Ottawa (2001-2005)
  - Program chair and local arrangements chair of the International Conference on 3–D Imaging and Modelling held at the Banff Centre in October 2003
  - Member of scientific advisory board of the Banff Centre New Media Institute, April 2004 to 2007
  - Chairman of the NSERC scholarship selection Committee in Engineering 2002
  - Program chair of the International Conference on 3–D Imaging and Modelling held in Ottawa in May 1999

- Chairman of the SPIE Conference on Rapid Product Development Technologies, 1997
- IMS International Technical Coordinator, 1994-1997
- Visiting scientist at the Electro-Technical Laboratory (ETL) in Tsukuba,Japan for six months, 1991
- Program Chair for 1989 Vision Interface Conference in London, Ontario

Awards and Grants

- FRQNT: NOVA Project – April 2023 – $134K for three years
- CIHR: Examining Population-Level Mortality from the Electrocardiogram using Artificial Intelligence (EXPLORE-AI)– Aprilk 2021–$596 for three years
- Heart and Stroke Foundation: MedBIKE project – July 2021–$300K for two years
- Alberta Innovates AICE Concepts: Advancing Cardiac Disease Diagnosis with Robotic Multiview Echocardiography Fusion and Machine Learning – April 2021-24 – $600K for three years
- CAMIS RAH Foundation MIS Research Fund – February 2017 – $22K for one year
- CIHR/NSERC Collaborative Health Research Program – April 2016 –$480K for three years
- Ward of the 21^{st} Century Award for the Best Business Idea: MedROAD Inc. – June 2015
- CIHR eHIPP – April 2015 – $1.5M for four years
- NSERC Engage – September 2014 – $25K
- CAMIS RAH Foundation MIS Research Fund – October 2014 – $48K for two years
- CISCO Chair in health care Solutions – July 1 2013 – $200K/year for 10 years
- SERVIER Canada to create the SERVIER Virtual Cardiac Centre – April 1 2013 – $1.5M for 5 years
- Honorific professor National University of Colombia, August 2012
- Final nominee for the 2010 ASTech award for technical achievement
- Federal Partners in Technology Transfer Award 2009
- Department of Computing Science Research Award 2009
- Visiting Professor Award at INSA of Lyon, Summer 2009 – 3500 Euro/month
- iCORE Industrial Chair on Virtual Collaborative Environments, 2005-2010 – $150K/year
- Government of Alberta IST Program, 2006-2007 – $155K/year
- Hewlett Packard Industry/University Collaboration Program, 2006-2007 – $65K
- Precarn Advanced Industrial Program, 2006-2007 – $144K

- Edmonton Diagnostic Imaging Clinic contribution to AMMI laboratory, 2006 – $37K
- Canarie HAVE project, 2005-2006 – $75K/year
- Canarie MediaLightPath project, 2005-2006 – $78K/year
- ASRA Award, 2004-2006 – $20K/year
- Grant for a co-production with an artist Chris Cran at the Banff Centre Institute for New Media, Summer 2003 – $5K.
- Heritage Canada Grant WEB 3-D network (in collaboration with Netera) 2002-2003 – $242K
- Western Economic Diversification Program, Project: High Performance Access to Grid Computing (in collaboration with BigBangWidth Inc.) 2004 –$895K
- NSERC Equipment Grant 2023 – $114K
- NSERC Equipment Grant 2019 – $120K
- NSERC Equipment Grant 2017 – $115K
- NSERC Equipment Grant 2015 – $40K
- NSERC Equipment Grant 2012 – $64K
- NSERC Equipment Grant 2011 – $85K
- NSERC Equipment Grant 2009 – $95K
- NSERC Equipment Grant 2005 – $139K
- NSERC Discovery Grant 2018–2023–$28K/year
- NSERC Discovery Grant 2013–2018–$25K/year
- NSERC Discovery Grant 2006-2012– $27K/year
- NSERC Discovery Grant 2001-2005 – $25K/year
- CFI New Opportunity Grant 2002 – $895K
- CFI Westgrid II Project (Principle Investigator) 2008 – $100K
- CFI CyberCell Project (Contributing Researcher)2006 – $50K
- Canarie Inc. Project RACOL (Contributing Researcher) – $10K
- **Ten U.S. Patents awarded between 1990 to 2022**
- Royalties for Inspection software package developed during my work at NRC $20K/year for 15 years
- AIST (Japan) Doctoral Fellowship, 1991 – $50K

Teaching Experiences

- At the University of Alberta, I have been teaching the following courses:
  - Undergrad Courses
    - CMPUT114 Introduction to Computer Science using Java (2001-2003)
    - CMPUT115 Programming with Data Structures using Java (2001-2003)
    - CMPUT411 Introduction to Computer Graphics (2003-2005)
    - CMPUT414 Introduction to Multimedia (2009-2012)
    - CMPUT300 Computers and Society (2012)
    - CMPUT475 Computational Displays (2015)
    - CMPUT302 Introduction to Human Computer Interaction (2012-2016)
    - CMPUT382 Introduction to GPU Programming (2016-2024)
  - Graduate Courses
    - CMPUT612 Introduction to Virtual and Augmented Reality (2006-2008)
    - CMPUT610 Point Based Graphics (2012)
    - CMPUT613 Sensor Based Geometric Modeling for Medical and Virtual Reality (2013-2018)
    - CMPUT615 Advanced Visualization of Medical Data (2013)
    - CMPUT605 Real-time Signal Processing Using GPU (2015)
    - CMPUT615 Introduction to General Purpose Computation on GPU (2015-2016)
    - CMPUT615 Introduction to Haptics (2012 and 2017)
    - CMPUT675 Advanced Signal Processing for Computer Scientists (2012-2018)
    - CMPUT605 Advanced Haptic Systems (2019)
    - CMPUT619 Fundamental of Medical Imaging (2013-2024)
    - CMPUT605 Deep Learning for Medical Image Analysis (2018-2024)
    - CMPUT604 Quantum Computing for Computer Scientists (2018-2024)
    - MM806 Introduction to Virtual Reality and Tele-presence (2016-present)
  - **My average teaching evaluation score is 4.2/5 over all**
  - Extra Teaching
    - Gave a two day Workshop on 3D Scanning for Conservators, May 2015
    - Gave a two week summer course on patient specific modeling, April 2013
    - Gave a one week summer course on sensor-based modeling at the National University of Colombia in Bogota, Colombia, July 2011
    - Course on medical imaging: 3-D Modeling for Medical Applications Digital Design in Facial Prosthetics organized by iRSM, April 2010, May 2011 and 2012
    - Gave a three month course on sensor-based geometric modeling at Los Andes University in Bogota, Colombia, Autumn 2008
    - Gave a one week course on computer graphics at Technologico de Monterey in Guadalajara, Mexico, Summer 2006
    - Gave a one month course on 3-D Imaging and Modeling at EAFIT University in Medellin Colombia, Winter 2006
    - Gave a two week course on Virtual Reality at the National University of Colombia at Manizales, Summer 2003

* Gave a series of six lectures on Virtual Reality for the Arts at the University of Ottawa Department of Fine Arts, Winter 2002
* Gave a day tutorial on VR at the Banff Interactive Screen Workshop, July 2002
* Gave and created a course on Virtual Reality at the University of Quebec in Hull, winters of 1999 and 2000
* Gave two tutorials on "Coherent Framework for Processing Geometric Signals" at the 1997, 1999, 2001, and 2003 International Conferences on Recent Advances in 3-D Digital Imaging and Modeling, Ottawa, Canada
* Gave three hour courses on 3-D computer graphics and virtual reality systems at Carleton University in 1996
* Gave a series of graduate courses in 1990, 1991, and 1992 at École Polytechnique on 3-D computer vision and image processing.
* Teaching assistant in the Department of Physics at Laval University (Continuous Mechanics and Ion Optics), 1981

Publications

Authored more than 415 scientific publications (as of January 2026) in computer vision, image processing, medical imaging, virtualized reality, and rapid product development, along with ten US patents. A recent publication list is available on ResearchGate: `https://www.researchgate.net/profile/Pierre_Boulanger/` (some publications may be missing).

Recent Invited Talks

- Invited Talk to Q-Site Quantum Image Processing Vancouver, Canada, September 2024
- Invited Talk V-SENSOR-24, A Geometric Approach for Processing Medical Images, Online October 2024
- Invited Talk to UBC *MedROAD: a Next Generation Tele-Health System*, Vancouver, Canada, April 2023
- Invited Talk to University of Calgary *Image Processing Using Quantum Neural Networks* , Calgary, Canada, May 2023
- Invited Talk to AlbertaAI *MedROAD a Next-Generation e-Health System for COVID-19*, Edmonton, Canada, June 2020
- Invited Talk to PROBUS Club *Modernizing Canada's Healthcare System Using AI and Mixed Reality*, Edmonton, Canada, June 2019
- Invited Talk to Faculty of Science BC Alumni association of Vancouver and Victoria *Artificial Intelligence and AR/VR for Healthcare*, Vancouver and Victoria, Canada, May 2019
- Invited Talk to Smart Network seminars *Application of VR and AR in Surgical Training and Planning*, Edmonton, Canada, February 2019
- Invited talk on VR/AR After Dark *Application of VR and AR in Surgical Training and Planning*, December 2018

- Invited talk at the VR/AR association of Alberta *VR and GPU for Big Data Analytics in Medicine*, April 2018
- Invited Talk to Athabasca University Symposium on VR/AR Applications *Application of VR and AR in Surgical Training and Planning*, Edmonton, Canada, December 2017
- Invited talk at the Computer Research Institute of Montreal (CRIM) *from Medical Imaging to Patient Specific Modeling*, Montreal, Canada, May 2017
- Gave Key Note Lecture at the Grand Rounds seminar organized by the Faculty of Medicine *From Medical Imaging to Patient Specific Modeling for Surgical Planning and Image Guided Surgery*, Edmonton, Canada, February 2017
- Gave a talk at the GPU Technology Conference Real-Time *Free Viewpoint TV System Based on a New Panorama Stitching Framework*, San Jose, USA, April 2016
- Gave an invited talk to the 12th Annual Summit on Mobile Healthcare *The MedROAD System*, Toronto, Canada, March 2016
- Gave an invited talk at the symposium exhibiting sound' at the Faculty of Music *Sonification in Science*, Edmonton, Canada, October 2015
- Gave an invited talk to VR Nights *Virtual and Augmented Reality: In Pursuit of an Elusive Dream*, Edmonton, Canada, September 2015
- Gave an invited talk at the CAC Conference Workshop: 3D Scanning for Conservators 2015 *Digitizing Columbia National Museum Treasures*, Edmonton, Canada, 2015
- Invited talk at the World Congress on *Recent Development in Closed-loop Visual Simulations* in Computational Mechanics, Barcelona, Spain, July 2014
- Seminar at GPU Technology Conference *A GPU-based Free-viewpoint Video System for Surgical Training*, San Jose California, March 2014
- Keynote speech at Surfnet *Surface Technologies Past, Present, and Future*, Calgary, Alberta, June 2013
- Invited talk at CHI *The Theater of the Twenty-first Century May Well be Virtual and Online*, Paris, France, May 2013
- Seminar at GRAND NCE *The Theater of the Twenty-first Century May Well be Virtual and Online*, Edmonton, Alberta, April 2013
- Seminar at Telus *Is Multi-view Video the Future of IPTV?*, Edmonton, Alberta, September 2012
- Seminar at HP Research *Free-viewpoint Video for Surgical Training?*, Palo Alto, USA, September 2012
- Seminar at Cross Cancer Institute, *From Video Games to Virtual Medicine: the Amazing Development of the GPU*, Edmonton, Alberta, May 2012

- Seminar at University of Calgary *Collaborative Virtual Environment for Computational Sciences*, Calgary, Alberta, April, 2012
- Seminar at TRLabs *Is Multi-view Video the Future of Television?*, Edmonton, Alberta, April 2012.
- Invited Talk GRAND NCE Workshop, *Avatars and the Future of Online Virtual Theatre*, Edmonton, Alberta, March 2012
- Digital Humanities Seminar *Digitizing and Delivering Cultural Heritage in 3-D* , Edmonton, Alberta, March 2012
- Seminar at the Cook Group *From Medical Imaging to Virtual Treatment Planning and Training*, December 2011
- Seminar at Cross Cancer Institute *GPU an Affordable HPC for Medical Physics*, Edmonton, Alberta, October 2011
- Colloquium at Simon Fraser University *From Medical Imaging to Virtual Treatment Planning and Training*, Burnaby, BC, September 2011
- Guest Lecture at iRSM entitled *From Medical Imaging to Surgical Planning and Training: A Complex Story*, Misericordia Hospital, July 2011
- Invited Talk at TELUS Annual Conference *Is Multi-view Video the Future of Television Over the Net?*, June 2011
- Guest Lecture at INSA of Lyon *Tissue Modeling from Sensors*, France, December 2010
- Keynote speaker at Digitizing Days Workshop *Digitizing the El-Dorado*, University of Alberta, December 2010
- Invited speaker at Westgrid coast to cost seminar *Development of Closed-loop Simulation and Visualization Interfaces Using GPU*, November 2010
- Invited speaker at Westgrid coast to cost seminar *Multi-modal Exploration of Large Scientific Data Using Virtual Reality*, July 2010
- Invited speaker at the 1st North American Workshop on Advanced Digital Technology in Head and Neck Reconstruction, Vail, Colorado, February 2010
- Distinguish Guess Lecture at the Electronic Visualization Laboratory *An Advanced Collaborative Infrastructure for Real-Time Computational Steering*, University of Illinois, November 2008
- Invited speaker at the 3rd International Conference on Advanced Digital Technology in Head and Neck Reconstruction, Cardiff, England, July 2008
- Keynote speech at the AG retreat in Vancouver *Computational Steering over AG*, May 28th, 2008
- Keynote speech at the 2nd International Conference on Computer and the Art *A critical review of Virtual Reality for the Art*, Mexico City, April 2008

- Invited speaker at the First International Conference on Tele-Presence, San Diego, California, June 2007
- Invited talk *Virtual Reality: A New Tool for Rehabilitation*, Virtual Rehabilitation: Visioning the Art of the Possible, Edmonton, Alberta, May 27th, 2005
- Invited talk to Computational Biomolecular Design to the Virtual Exploration of the Genome Seminar *A State-of-the-Art of the link between Visualization and Simulation for Bioinformatics*, WestGrid Summit at the Banff Centre, April 19-20, 2005
- Invited talk *Collaborative Virtual Manufacturing from the Ground Up*, Fifth Annual Advanced Networks Conference in Vancouver, BC, April 26-27, 2005

Professional memberships

- AR/VR Association of Alberta
- Canadian Association of Quantum Computing
- Institute of Electrical and Electronic Engineers (IEEE): Computer Society
- Canadian Image Processing and Pattern Recognition Society
- Association for Computing Machinery (ACM)

Reviewer for the Following Journals

- Editor for the MDPI Journal Sensor
- Reviewer for the MDPI Journal Virtual Worlds
- Associate Editor for Cancer Imaging and Image-directed Interventions (specialty section of Frontiers in Oncology)
- Editorial Board of the Journal Sensor
- Guest Editor for the review Sensor Special Issue "Novel Approaches to Preventive and Occupational Telemedicine Based on Sensor Fusion"
- Guest Editor for the review Sensor Special Issue on Extended Reality: Applications in Rehabilitation
- Journal of Computer Science and Informatics
- Frontiers ICT
- Transactions of the Society for Modeling and Simulation International (SMS)
- Intelligent Data Processing Journal (Elsevier Science)
- Transaction on Pattern Analysis and Machine Intelligence (IEEE)
- Computer Vision, Graphics, and Image Processing (Academic Press)

- Pattern Recognition Letters (Elsevier)
- Machine Vision and Application(springer)
- Computer Aided Design (Elsevier)
- The Visual Computer (Springer)
- Journal of Mechanical Engineering Science (Professional Engineering Publishing)
- Systems, Man, and Cybernetics Part C (IEEE)
- Colombian Dyna Journal (Pub. National University of Colombia)

Reviewer for the Following Agencies

- Fonds pour la formation de Chercheurs et Aide à la Recherche (FCAR), Canada
- Canadian Fund for Innovation (CFI), Canada
- Canada Research Chair (CRC), Canada
- Natural Sciences and Engineering Research Council of Canada (NSERC), Canada
- Canadian Institutes of Health Research (CIHR), Canada
- Industrial Research Assistance Programs (IRAP), Canada
- MITACS, Canada
- National Science Foundation (NSF), USA
- Qatar National Research Fund, Qatar
- Agence Nationale de la Recherche (ANR), France

Committees

- Member of the Computing Science Chair Selection Committee (2023)
- Member of the Ethics Board Committee of the University of Alberta (2021-2024
- President of the FQRS selection committee "Chaire de recherche double en intelligence artificielle en santé / santé numérique et sciences de la vie" (2021)
- Member of the editorial board of the journal Sensor (2020-present)
- Member of the ELIXR Board of Directors (2019-2025)
- Member of the scientific board of the Computer Research Institute of Montréal (2015-present)
- Member of the CIHR College of Reviewers (2017-present)
- Member of the editorial board of the Journal of Radiology (2017-2023)

- Member of the MITAC College of Reviewers (2016-present)
- Member of the Faculty of Science strategic research committee (2016-2019)
- Faculty of Science representative at the dean of medicine council meetings (2013-2016)
- Member of the editorial board of the Journal of Computer Science and Informatics (2015-Present)
- Member of the editorial board of Frontiers ICT Image Analysis (2015-Present)
- Member of the Steering Committee of the Smart Graphics Conference 2015
- Program committee member of The Engineering in Medicine and Biology Conference (2014-2016)
- Member of the Faculty of Science Kaplan award committee 2012
- Member of the Faculty of Science Advisory Selection Committee 2011
- Member of the Department of Computing Science hiring committee (2009-2015)
- Faculty of Science representative at the Collége Saint-Jean dean council meetings (2010-2021)
- Member of the Killam Award Program of the Canada Council for the Arts (2010-2013)
- Member of the ADT for Maxillofacial surgery - North America Advisory Group (2009-2017)
- Member of the NSERC Discovery Grant Committee (2006-2009)
- Member of the University of Alberta Museums Digitization Committee (2003-2006)
- Program committee member of the thirteenth IAPR Conference on Machine Vision Applications 2013
- Program committee member of the Workshop on Multimedia Signal Processing 2012
- Program committee member of the 3DIMPVT conference (2011-2012)
- Program committee member of the Canadian Conference on Computer and Robot Vision (2005, 2006, 2007, 2008, 2010, 2014, 2015, 2016, 2018)
- Program committee member of the Fifth IEEE International Symposium and School on Advanced Distributed Systems 2005
- Program committee member of the International Conference on 3-D Digital Imaging and Modeling (2005-2007-2013)
- Program committee member of the 18th International Conference on Pattern Recognition (2006-2010)
- Program committee member of the 31st Latin American Informatics Conference 2005
- Program committee member of the Eurographics 2005 Conference

- Program committee member of High Performance Computing Symposium 2004
- Member of the NSERC scholarship selection Committee in Engineering (2000-2003)
- Program committee member of the Conference on Pattern Recognition Program committee - 2002.
- International Program Committee of the QCAV International Conference on Quality Control by Artificial Vision (2001, 2002, and 2003)
- International Program Committee for ACM Virtual Reality Software and Technology (2001 and 2002).
- Program committee member of the Third International Conference on 3–D Imaging and Modeling 2001
- Program committee member of Vision Interface (2001, 2002, 2003, and 2004)
- Program committee member of the International Conference on Pattern Recognition 2002
- Program committee member of Third International Conference on Virtual Reality and its Application in Industry, VRAI, 2002
- Program committee member of RFIA 2000 conference on computer vision, 2000

HQP Contributions

I have supervised and co-supervised 18 postdoctoral and visiting professors, 36 Ph.D., and 50 M.Sc. students (up to December 2024).

- **Post-docs and Visiting Researchers**
  - **Victoria Sarban**, *Clinical Validation of Multi-view Ultrasound to Cardiac Diagnostic*, postdoc, University of Alberta, one year, 2019
  - **Zeinab Zeinalkhani**, *RNN Segmentation of Stroke Brain Damage using Perfusion Imaging*, postdoc, University of Alberta, one year, 2019
  - **Jenny Cifuentes**, *Surgical Gesture Recognition Using LSTM*, Visiting Professor, National University of Colombia, three months, 2018
  - **Fateme Esfandiarpour**, *In-vivo Patellar Tracking in Individuals with Patellofemoral Pain and Healthy Individuals*, Visiting Researcher, Teheran University, one year, 2018
  - **Brendan Robert**, *Knee Bones Segmentation from MRI Using U-Net*, Visiting Researcher, INSA of Lyon, six months, 2018
  - **Liliane Machado**, *MedBIKE Usability Analysis*, Visiting Professor, Federal University of Paraiba, Brasil, six months, 2018
  - **Taylor Lamb**,*Clinical Application of Multi-view Ultrasound to Cardiac Diagnostic*, postdoc, University of Alberta, one year, 2017
  - **Daniel Oloumi**,*Microwave Tomography for Breast Inspection*, Postdoc, University of Alberta, one year, 2017

- **Kevin Chan**, *Biopsy Needle Tracking Using Microwave Tomography*, Postdoc University of Alberta, one year, 2016
- **Dan Romanyk**,*FEM Modeling of the Human Jaw*, Postdoc, University of Alberta, one year, 2015
- **Mohammed Ben Salah**,*Temporal Registration of CT, MRI, and Fluoroscopic Data*, Postdoc, INRS, two years, 2013-2014
- **Minh-Tu Pham**, *By-lateral haptic Control and Comparison of Surgical Gestures Using Force, Torque, and Position*, Visiting Professor, INSA of Lyon, one year, 2010
- **Jean Marie Beaulieu**, *Hierarchical Segmentation of Color Images*, Visiting Professor, Laval University, Three Months, October 2007
- **Flavio Prieto**, *Deformable Part Inspection*, Visiting Professor, National University of Colombia, Six Months, June 2007
- **Patrick Hebert**, *3-D Image Processing*, Visiting Professor, Laval University, Six Months, September 2006
- **Manuel Garcia**, *Virtual Wind Tunnel*,Visiting Professor, EAFIT University, One year, 2005-2006
- **Kikuo Asai**, *Large Scale Visualization Problems*, Postdoc, University of Tokyo, One Year, January 2003

- **Ph.D. Thesis**
  - **Athar Mahmoudi-Nejad**, *Optimizing the effect of VR-based exposure therapy using reinforcement learning based on the automatic recognition of stress levels from physiological measurements*, Ph.D., January 2025
  - **Shadan Golestan-Irani**,*Simulation-based Sensor Configuration Optimization to Detect Human Activities in Smart Indoor Spaces*, Ph.D., June 2023
  - **Mohsen Soltanpour**, *Ischemic Stroke Lesion Segmentation from CT Perfusion Scans*, Ph.D., March 2023
  - **Hong Zu Li** *Continuous Heart Anomaly Detection System with Motion Artifacts Suppression*, Ph.D., January 2023
  - **Shrimanti Ghosh**, *Anatomy Deformation Estimation During Gynecological Brachytherapy Treatments*, Ph.D., December 2022
  - **Deepa Krishnaswamy**,*4D Semi-Automated Algorithm for Volumetric Segmentation in Echocardiography*, Ph.D., University of Alberta, December 2021.
  - **Ray Yang**, *CUDA-based Dose Calculations for Radiation Therapy Dosimetry*, Ph.D., University of Alberta, September 2019
  - **Nathanial Maeda**, *Augmented Reality Simulator for Chiropractic Procedures*, Ph.D., University of Alberta, Ph.D., October 2018
  - **Mohammed Al-Saleh**, *Fused Magnetic Resonance Imaging and Cone-Beam Computed Tomography: A New Concept of Temporomandibular Joint Diagnostic Imaging*, Ph.D., University of Alberta, September 2016
  - **Amir Sharifi**, *Depth-of-Field Effect in Real-Time Direct Volume Rendering*, Ph.D., University of Alberta, November 2016

- **Qiong Wu**, *Tagging by Interactive Image Discovery: Tagging-Tracking-Learning*, Ph.D., University of Alberta, September 2016
- **Idanis Diaz**, *Tracking Brain Tumor Evolution Using Deformable Atlases*, Ph.D., University of Alberta, March 2015
- **Jennifer Cifuentes**, *Automatic Medical Gesture Analysis*, Ph.D., National University of Colombia, April 2015
- **Daniel Oloumi**, *Algorithms for Microwave Tomography for Breast Cancer Detection*, Ph.D., University of Alberta, December 2016
- **Xing Dong Yang**, *Blurring the Boundary between Direct and Indirect Input Shared Environments*, Ph.D., University of Alberta, August 2013
- **Xiaozhou Zhou**, *A Solution to the Eye Contact Problem in Tele-presence System*, Ph.D., University of Alberta, April 2013
- **Matthew Hamilton**, *Methods for Multi-scale Point-Based Visualization*, Ph.D., University of Alberta, August 2012
- **Robyn Taylor**, *Designing from Within: Exploring Experience through Interactive Performance*, Ph.D., University of Alberta, July 2012
- **Andres Eleazar Jaramillo**, *Automated Shape Inspection of Deformable Parts*, Ph.D., co-direction with Flavio Prieto at the National University of Colombia at Manizales, June 2012
- **Steven Eliuk**, *Enhancements to Reconstruction Techniques in Computed Tomography Using High Performance Computing*, University of Alberta, Ph.D., May 2012
- **Victor Mayorga**, *Geometric Approach to Multi-scale 3-D Gesture Comparison*, Ph.D., July 2010
- **Baochun Bai**, *Multivew Video Compression*, Ph.D., University of Alberta, March 2010
- **John Branch**, *Reconstruction of Free Form Objects from Range Images Using a Net of NURBS Patches*, co-direction with Flavio Prieto at the National University of Colombia at Manizales, April 2007
- **Irene Cheng**, *Feature Extraction and Adaptive On-line Visualization of 3-D TexMesh Using Scale-space Analysis and Perceptual Evaluation*, Ph.D., University of Alberta, April 2005
- **Ruyam Acar**, *Digital Marbling Based on Computational Fluid Dynamics*, Ph.D., University of Alberta, March 2005
- **Pablo Figueroa**, *Re-targeting Virtual Reality Applications* , Ph.D., University of Alberta, December 2003
- **Paul Ferry**, *Eikon: A Tool for Geometric Coding of Large Multivariate Datasets*, Ph.D., University of Alberta, August 2002.
- **Flavio Prieto**, *CAD-based range sensor placement for optimum 3-D data acquisition*, Ph.D., INSA de Lyon, France, January 2000
- **Mike Greenspan**, *Geometric Probing for 3-D Object Recognition in Dense Range Data*, Ph.D., Carleton University, May, 1999.
- **Véronique Moron**, *Mise en correspondence de données 3–D avec un modèle CAO: Application à l'inspection automatique*, Ph.D., INSA de Lyon, France, December 1996

- **Master thesis**
  - **Sadid Bin Salam**, *Comparing Geodesic Filtering on Riemannian Manifolds to State-of-the-Art Algorithms*, M.Sc., April 2025
  - **Vishwajeet Uttam Ohal**, *Quantum Annealing for Machine Learning: Exploring NISQ Optimization for Image Processing* , M.Sc., January 2025
  - **Farnoosh Fatemi Pour**, *Visualizing Neural Networks in Action Using Virtual Reality*, M.Sc., December 2021
  - **Michael Feist**, *Multiview 3–D Sensing*, M.Sc., University of Alberta, November 2021
  - **Mahdi Rahmani Hanzaki**, Image Guided Surgery Using Virtualized Reality and Proxy Haptic, M.Sc., University of Alberta, March 2020
  - **Pouneh Gorji**, *Fatty Liver Diagnosis from Ultrasound Using U-Net Deep Neural Network*, M.Sc., University of Alberta, January 2020
  - **Nazanin Tahmasebi**,*A Fully Convolutional Deep Neural Network for Real-time Lung Tumor Boundary Tracking in MRI for Adaptive Radiotherapy*, M.Sc., University of Alberta, October 2020
  - **Paola Sanchez Perdomo**, *Intubation Training Using Eye Tracking and Proxy Haptic*, M.Sc., University of Alberta, October 2019
  - **Amir Pournajib**, *MIS Training Using Haptic Guidance*, M.Sc., University of Alberta, December 2018
  - **Chirag Balakrishna**, *Surgical Planning in a Collaborative Virtual Environment*, M.Sc., University of Alberta, December 2018
  - **David Alejandro Cocom Basto**, *Usability Study of Collaborative Virtual Environment for Surgical Planning*, M.Sc., University of Alberta, January 2019
  - **Nehan Khan**,*Multiview Registration of Ultrasound Data Using Magnetic Tracker*, M.Sc., University of Albertya, December 2018
  - **Mina Abdi Oskouie**,*Haptic Perception in Virtual Environments Using Proxy Objects: A Usability Study*,M.Sc., University of Alberta, January 2019
  - **Sadegh Charmchi**,*Optimized U-Net for Left Ventricle Segmentation*, M.Sc., University of Alberta, October 2018
  - **Shimanti Ghosh**, *Pulse Transit Time Computation Using Signal Sparsity For Continuous Blood Pressure Prediction*, M.Sc., University of Alberta, April 2018
  - **Muhammad Zeshan**, *MedROAD for Aged Care Monitoring*, M.Sc., University of Alberta, April 2016
  - **Vaibhav Dixit**, *Interactive Tele-medicine System for MedROAD*, M.Sc., University of Alberta, April 2016
  - **Hong Zu Li**, *Validating the Acceptability of 12-lead ECG Signals*, M.Sc., University of Alberta, December 2016
  - **Ruyi Wang**, *Interactive Game for Children and Parents*, M.Sc., University of Alberta, December 2016
  - **David Pinzon**, *Learning Through Haptics: Haptic Feedback in Surgical Education*, M.Sc., University of Alberta, September 2016

- **Simon Byrns**, *Hand and Eye Gaze Analysis for the Objective Assessment of Open Surgical Dexterity*, M.Sc., University of Alberta, June 2016
- **Usman Aziz**,*Real-time Free Viewpoint TV Delivery*, M.Sc., University of Alberta, August 2015
- **Kyrylo Shegeda**, *Free-viewpoint TV over IPTV*, M.Sc., University of Alberta, November 2013
- **Elizabeth Mesa**, *Characterization of Brain Tissue Phantom using an Indentation Device and Inverse Finite Element Parameter Estimation Algorithm*, M.Sc., National University of Colombia, September 2011
- **Juan Ramirez**, *Mesh-less Method Implementation for Needle Insertion Simulation*, M.Sc., National University of Colombia, September 2011
- **Biao She**, *A system for real-time rendering of compressed time-varying volume data*, M.Sc., University of Alberta, March 2011
- **Niousha Bolandzadeh**, *Multi-modal registration of maxillo-dental CBCT and photogrammetry data over time*, M.Sc., University of Alberta, February 2011
- **Cai Lu Sapphire Zhao**, *Interactive simulation and visualization of complex physics problems using the GPU*, M.Sc., University of Alberta, January 2011
- **Fraser Anderson**, *Objective Surgical Skill Evaluation*, M.Sc., University of Alberta, December 2010
- **Juan Duque**, *A Virtual Wind Tunnel Based on OpenFOAM*, M.Sc., co-direction with Manuel Garcia at the EAFIT University in Medelling, Colombia, June 2010
- **Mario Gomez**, *Finite Element Formulation for Large Displacement Analysis for Inspection of Deformable Parts*, M.Sc., co-direction with Manuel Garcia at the EAFIT University in Medelling, Colombia, April 2009
- **Qiong Wu**, *Robust Real-Time Bi-Layer Video Segmentation Using Infrared Video*, M.Sc., University of Alberta, June 2008
- **Fakui Wang**, *A Critical Review of Tele-presence Systems*, M.Sc., University of Alberta, April 2008
- **Xing Dong Yang**, *A Performance Analysis of Motor-skill Training Using Haptic Training*, M.Sc., University of Alberta, March 2008
- **Rui Shen**, *Medvis: A Real-Time Immersive Visualization Environment for the Exploration of Medical Volumetric Data*, M.Sc., University of Alberta, March 2007
- **Robyn Taylor**, *Augmenting Live Musical Performance Through Music Visualization*, M.Sc., University of Alberta, April 2006
- **Maryia Kasakevich**,*Enhanced rendering of fluid field data using Sonification and Visualization*, M.Sc., University of Alberta, March 2006
- **Martha Benitez**, *Design of a Prototype Tele-Immersive System Based on View-Morphing*, M.Sc., University of Alberta, December 2004
- **Winton Wong**, *View Interpolation for Shared Virtual Environments*, M.Sc., University of Ottawa, March 2004
- **Bryan Armstrong**, *A Critical Analysis of the Eight-Points View Morphing Algorithms for a Tele-Immersion Application*, M.Sc., University of Alberta, October 2003

- **Dominic Laberge**, *Real-time 3-D tracking for Virtual Reality Systems*, M.Sc., University of Ottawa, September 2003
- **Daniel Torres**, *The ANIMUS Project: A Framework for the Creation of Synthetic Characters*, M.Sc., University of Alberta, August 2003
- **Gustavo Osorio**, *Segmentation of Range Image with Shape Constraints*, M.Sc., co-direction with Flavio Prieto at the National University of Colombia at Manizales, June 2003
- **Peiran Liu**, *Augmented Reality Environments for Mobile Applications*, M.Sc., University of Ottawa, July 2002
- **Xiao Wei Zhong**, *Mobile Collaborative Augmented Reality: A Prototype for Industrial Training*, M.Sc., University of Ottawa, July 2002
- **Belinda Lee**, *Motion Analysis of Video-Rate Image Sequences*, M.Sc., Simon Fraser University, December, 1997
- **Vania Conan**, *Recalage de données 3–D à partir d'une reconstruction de surface spline par filtrage numérique*, M.Sc., École des Mines de Paris, France, Dec. 1996
- **Ming Cung**, *Extraction multi-échelles des discontinuités géométriques*, M.Sc., École Polytechnique, Montréal, May, 1993
- **Pierre Beaulieu**, *Reconnaissance d'objets 3-D par système expert*, M.Sc, Laval University, Québec City, June, 1990

Computer skills

- Computer Languages: Python, Q#, C#, C, CUDA, OpenCL, UML, MATLAB
- Operating Systems: Linux: Red Hat and SUSE, Microsoft Windows
- Software SDKs: GLUT, QT, OpenGL, Performer, OpenCV, CGAL, VTK, ITK, OpenFOAM, MiddleVR, NiftyNET, Tensorflow, Pennylane, Qiskit
- Software Development Environments: Visual Studio, CMAKE, CASE Tools, Jupyter Notebook
- Visualization tools: SLICER 3D, Volview, Paraview
- CAD Softwares: CATIA, Abacus, Rhino-3D, Maya, Rapidform, Geomagic, Polyworks, Unity 3D

Hobbies

Outside of professional pursuits, I enjoy a wide array of personal interests. A dedicated history buff with a love for gourmet cooking, fine wine tasting, and winemaking. Gardening provides a creative outlet and connection to nature, while music—both listening and reading about its history and composition—offers ongoing inspiration. I also have a fascination with theoretical physics that extends my intellectual curiosity beyond the professional realm, exploring the fundamental principles that govern the physical world.