

Pierre-André Brousseau

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Summary

- PhD in 3D Vision and Biomedical Engineer, specializing in depth estimation, cameras and deep learning.
- Experienced in developing real-time computer vision systems (ICCV, BMVC).
- Proficient in Mathematica, PyTorch, OpenCV, and geometric modeling, with open-source contributions.

Education

PhD	Université de Montréal , Computer Science, 3D Vision. <i>Honors List</i>	Jan 2020 – Oct 2025
	<ul style="list-style-type: none">• Thesis: Stereoscopic Depth Estimation with Permutation.• Developed an epipolar rectification framework enabling real-time absolute depth from monocular videos. Published at ICCV.• Built self-supervised deep learning models for depth estimation, applied to medical imaging and autonomous navigation. Published at BMVC.• Ranked among top self-supervised methods on KITTI stereo (2021).	
MSc	Université de Montréal , Computer Science, Artificial Intelligence	Sep 2016 – Dec 2019
	<ul style="list-style-type: none">• Thesis: Fisheye camera calibration and depth estimation for autonomous navigation.• Developed a calibration method for ultra-wide fisheye cameras, improving multi-fisheye 3D reconstruction systems. Published at ICCV.• Built a five-axis platform to capture pose–image datasets for FPV cameras.	
BEng	Polytechnique Montréal , Biomedical Engineering	Sep 2012 – Apr 2016
	<ul style="list-style-type: none">• Team Capstone Project: Miniature microscope implant for in vivo brain calcium imaging in mice.• Internship: Automatic segmentation of the vascular network in fundus images. (Liv4D Laboratory).	

Research & Project Experience

Spherical Epipolar Rectification – Single Camera Depth Estimation Pipeline	Project Website ↗
<ul style="list-style-type: none">• Led the development of a real-time end-to-end depth estimation pipeline, from mathematical prototype to Python implementation and testing.• Built supervised and self-supervised models using PyTorch and OpenCV for real-time monocular-to-stereo depth estimation.• Extended Wolfram's codebase with tensor transformation functions for deep learning.	
Studying Neuro-development of Children	
<ul style="list-style-type: none">• Collaborated with the NED Lab (Prof. Sarah Lippé) to define components for research on attention in children, contributing to successful funding approval.	
Quasi Central Calibration - Ultra-Wide Fisheye Camera Modeling	Project Website ↗
<ul style="list-style-type: none">• Designed a novel mathematical model, the virtual central model, for axial fisheye cameras, extending central projection theory to ultra-wide optics.• Released the first open-source calibration method for Entaniya 280° fisheye lens, leveraging structured light to achieve high-precision parameter recovery.• Validated performance on real-world data, demonstrating robustness to camera fabrication errors (e.g. FPV cameras) and enabling applications in 3D reconstruction, stitching, and LiDAR colorization.	

Teaching & Mentoring Experience

Lecturer & Graduate Mentor, 3D Vision Laboratory

Jan 2020 – Oct 2025

- Taught graduate-level 3D Vision and Deep Learning courses; responsibilities expanded from lab support to full lecture delivery and course design.
- Supervised and mentored graduate students, providing guidance on research planning, experimentation, and manuscript preparation.
- Contributed to successful grant proposals through experimental design and technical writing.

Project Mentor, Technological Arts Program.

Jan 2019 – Aug 2025

- Mentored 40+ students on individual technological projects, guiding them from concept to functional prototype.
- Advised on technical skills including IoT, programming, CAD, 3D printing, fabrication, and multimedia production.
- Guided students in project management: setting goals, managing timelines, adjusting to roadblocks, and pivoting when needed.

Publications

Spherical Epipolar Rectification for Deep Two-View Absolute Depth Estimation

Oct 2025

[Paper] ↗

Pierre-André Brousseau and Sébastien Roy. *International Conference on Computer Vision (ICCV)*.

Strong Stereo Features for Self-Supervised Practical Stereo Matching

Nov 2023

[Paper] ↗

Pierre-André Brousseau and Sébastien Roy. *British Machine Vision Conference (BMVC)*.

A Permutation Model for the Self-Supervised Stereo Matching Problem

Jun 2022

[Paper] ↗

Pierre-André Brousseau and Sébastien Roy. *Canadian AI and Robots & Vision Conference (AI-CRV) [Oral]*.

Calibration of axial fisheye cameras through generic virtual central models

Oct 2019

[Paper] ↗

Pierre-André Brousseau and Sébastien Roy. *International Conference on Computer Vision (ICCV)*.

Honors & Awards

Rector's Honour Roll (PhD, Université de Montréal)

2025

Outstanding Reviewer, British Machine Vision Conference (BMVC)

2024

FESP Artificial Intelligence Scholarship

2023

Arbour Foundation PhD Scholarship (two-time recipient)

2020, 2021

DIRO PhD Scholarship for Excellence (four-time recipient)

2022, 2023, 2024, 2025

Technical Skills

- **Languages:** Python, Wolfram Mathematica (contributor), C++
- **Frameworks & Libraries:** PyTorch, OpenCV, TorchVision, Kornia, NeRFStudio
- **Computer Vision & 3D:** Stereo Matching, Camera Calibration, Structure-from-Motion, Multi-View Geometry, 3D Reconstruction, Optical Flow, NeRF
- **Deep Learning:** Self-Supervised Learning, Model Optimization, Evaluation Pipelines, Data Augmentation
- **Software & Tools:** Git, Linux, Docker, LaTeX, VS Code
- **Mathematics:** Linear Algebra, Projective Geometry, Optimization, Numerical Methods, Probabilistic Modeling