Mathieu **Labussière**

Ph.D. in Computer Vision and Robotics

Contact

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Social media

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Languages

French Native

English Fluent
TOEIC *: 925/990 (2017)*

Chinese Basic level
HSK*: level 2 (2013)*

Russian Basic level

Qualifications

Section 61 2022
Section 27 2022

Certifications

Driving license
Permis B (2013)

First Aid Certification
PSC1 (2012)
SST (2019)

Aeronautics Initiation Certificate
BIA (2010)

Research Interest

Computer Vision • Plenoptic • Camera calibration • Depth estimation • Light field
Robotics • 3D mapping • 3D registration • Iterative Closest Point (ICP) • Lidar • Localization

Education

2018 - 2021 **Ph.D in Computer Vision and Robotics**
Université Clermont Auvergne, Institut Pascal, Clermont-Ferrand, France
Leveraging blur information with a plenoptic camera: calibration, depth estimation, and application to robust perception.
Supervisors: Céline Teulière (UCA), Frédéric Bernardin (Cerema), and Omar Ait-Aider (UCA).

2017 - 2018 **Master Perception Artificielle et Robotique (PAR)**
Université Clermont Auvergne, Clermont-Ferrand, France
Master's Degree in Computer Vision and Robotics. Carried out in conjunction with Master's Degree in Engineering at ISIMA.
Obtained with honors (ranked 4/24).

2013 - 2018 **Diplôme d'Ingénieur - Institut Supérieur d'Informatique, de Modélisation et de leurs Applications (ISIMA)**
ISIMA, Clermont-Ferrand, France
College of Engineering in Computer Science, Modeling and Applications delivering a diploma equivalent to a Master's Degree in Engineering, specialized in Embedded Systems.
Obtained with honors (ranked 1/120).

Professional Experiences

Sep. 2022 - *present* **Associate Professor**
at Université Clermont Auvergne, IUT, Institut Pascal, Clermont-Ferrand, France
Teaching at IUT Clermont Auvergne, in the Industrial Engineering and Maintenance department (GIM); *Research* at Institut Pascal, in the Computer Vision team of the ISPR department.

June 2022 - Sep. 2022 **Research Engineer in Computer Vision**
at Université Clermont Auvergne, Institut Pascal, Clermont-Ferrand, France
Research at Institut Pascal, in the Computer Vision team of the "*Images, Perception systems and Robotics*" (ISPR) department.

Jan. 2022 - June 2022 **Temporary Lecturer and Research Assistant (ATER)**
at Université Clermont Auvergne, EUPI, Institut Pascal, Clermont-Ferrand, France
Teaching at École Universitaire de Physique et d'Ingénierie (EUPI); *Research* at Institut Pascal, in the Computer Vision team of the ISPR department.

Mar. 2018 - Sep. 2018 **Research Internship - 3D Map Compression based on Differential Geometry** ICP, Lidar, Robotics, Localization, 3D Mapping, Differential Geometry
at Norlab - *Northern Robotics Laboratory*, Canada (https://norlab.ulaval.ca/)
Investigation of geometric structures (e.g., line, plane, curvature) as a way to reduce the number of points necessary for an accurate localization in the context of 3D maps acquired with lidar.

Mar. 2017 - Sep. 2017 **Research Internship - Development of a Visual SLAM to localize a drone**
SLAM, Image Processing, 3D Vision, Visual Odometry, Detector, Descriptor, Vocabulary Tree
at CEA/LIST, France (www.cea.fr)
Implementation of state-of-the-art algorithms (including detector, binary descriptor and a vocabulary tree using binary words) into the vision library for a visual SLAM. Evaluating the algorithms on datasets as EuRoC and KITTI.

Administrative Responsabilities

2020 - **Reviewing Services**
Reviewing of 3 conference papers (IROS, ICRA) and 4 journal papers (RA-L, TIP, Optics Communications).

2019 - **Communication management**
Management of the GitHub and ReasearchGate pages of the research team in the laboratory.

2018 - 2020 **Member of the organization committee for research seminar**
Organization and animation of seminars in the research department.
Organization of the doctoral scientific day of the doctoral scool in 2019.

2016 - 2020 **President and active member of the robotic organization I2C**
Organization of multiple events and workshops during the year to teach people how to build their own robots. Participating in several national and international robotic competitions (e.g., Robot Challenge (2016), RFIA (2016), La Nuit du Hack (2016, 2017), French Robot Cup (2018)).

Teaching

2022 **Robotics and Vision** Graduate course, 2nd year Master student at EUPI (UCA)
Graduate course about robotic modeling, image processing and 3D vision.

2022 **Deep Learning** Graduate course, 1st and 2nd year Master student at EUPI (UCA)
Graduate course about Deep learning with Pytorch.

2022 **Introduction to R.O.S.** Graduate course, 2nd year Master student at EUPI (UCA)
Graduate course about the middleware *Robot Operating System* (ROS).

2022 **Signal Processing** Graduate course, 1st year Master student at EUPI (UCA)
Graduate course about numerical signal processing (with Matlab).

2022 **Automation - Programmable logic controller** Graduate course, 1st year Master student at EUPI (UCA)
Graduate course about programming of logic controllers (including languages such as GRAFCET, Ladder, ST, etc.).

2019-2021 **Sensors integration for robotics: ROS** Graduate course, 3rd year Engineering student at ISIMA
Graduate course about Robot Operating System (ROS) for sensors integration and their simulation (including programming language C++, Python and the simulator Gazebo).

2018-2021 **Robotics** Graduate course, 2nd year Engineering student at ISIMA
Graduate course about robotics modeling, control, and their implementation on robotic platforms (robotic arm, mobile robot).

2018-2021 **Numerical control theory** Graduate course, 2nd year Engineering student at ISIMA
Graduate course about numeric control, regulation and their implementation on numeric platforms (line-follower robot, water/air flow, pendulum).

2018-2021 **Design of numerical systems** Graduate course, 1st year Engineering student at ISIMA
Graduate course about designing and simulating digital logic circuits system based on schematic and their implementation on FPGA (using Xilinx ISE and logisim-evolution).

2018-2019 **General mathematics** Undergraduate course, 1st year DUT GIM at IUT (UCA)
Undergraduate course about probabilities, linear algebra, Laplace transform, and differential equation.

Grants and Distinctions

2018 **Doctoral Research Grant**
by the AURA Region and the European Union (FEDER) through the MMII project of CPER 2015-2020 MMaSyF challenge.

2018 **Graduate Research Grant**
by WOW! Wide Open to the World Program from I-SITE CAP 20-25 project.

Scientific Communication

Thesis

"Leveraging blur information in plenoptic cameras: Application to calibration and metric depth estimation"
Mathieu Labussière*, Ph.D. Thesis, Université Clermont-Auvergne, Institut Pascal, Dec. 2021*

International journals

(2022) Leveraging Blur Information for Plenoptic Camera Calibration
Mathieu Labussière, Céline Teulière, Frédéric Bernardin, Omar Ait-Aider
International Journal of Computer Vision 2012 (May 2022), pp. 1–23. Springer US, 2022

(2020) Geometry Preserving Sampling Method Based on Spectral Decomposition for Large-Scale Environments
Mathieu Labussière, Johann Laconte, François Pomerleau
Frontiers in Robotics and AI 7.September (2020), pp. 1–15. 2020

International conferences/proceedings

(2020) Blur Aware Calibration of Multi-Focus Plenoptic Camera,
Mathieu Labussière, Céline Teulière, Frédéric Bernardin, Omar Ait-Aider
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2020, **Oral presentation**

(2019) Lidar measurement bias estimation via return waveform modelling in a context of 3d mapping,
Johann Laconte, Simon-Pierre Deschênes, Mathieu Labussière, François Pomerleau
IEEE International Conference on Robotics and Automation (ICRA), 2019

Workshops and others (without acts)

(2020) Leveraging Blur Information with a Plenoptic Camera: Calibration, Relative Blur calibration and characterization
Mathieu Labussière
Journée thématique GdR ISIS - Capteurs visuels émergents : vision plénoptique, *20 Nov. 2020,* **Oral presentation**

(2020) Blur Aware Calibration of Multi-Focus Plenoptic Camera
Mathieu Labussière, Céline Teulière, Frédéric Bernardin, Omar Ait-Aider
Reconnaissance des Formes, Image, Apprentissage et Perception (RFIAP) avec Conférence sur l'Apprentissage automatique (CAp), *Juin. 2020*

(2019) Plenoptic Cameras for Localization in Challenging Weather Conditions
Mathieu Labussière
Journée Scientifique de l'École Doctorale Sciences Pour l'Ingénieur (JS-EDSPI), *Mai. 2019,* **Poster**

(2018) Geometry Preserving Sampling Method based on Spectral Decomposition for 3D Registration
Mathieu Labussière, Johann Laconte, François Pomerleau
arXiv preprint arXiv:1810.01666*, 2018, (preprint)*

Submitted or under revision

(2022) Blur Aware Depth Estimation with a Plenoptic Camera
Mathieu Labussière, Céline Teulière, Frédéric Bernardin, Omar Ait-Aider
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) (2022), pp. 1–16. 2022, *(under revision)*