# Johann Laconte

*Ph.D. in Robotics*

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**Research Interests:** Robotics; Applied Mathematics; Traversability; State Estimation; Mapping.

## Education

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| 09 2022 | **Postdoc in Robotics**, *University of Toronto*. |
| | Development of mathematical tools for more resilient robots and intelligent vehicles |
| | **Supervisor:** Tim Barfoot |
| 03 2022–09 2022 | **Postdoc in Robotics**, *Laval University, Canada*. |
| | Supervision of several research projects around field robotics in nordic environments, aiming for publication at ICRA 2023. |
| | **Supervisor:** François Pomerleau |
| 2018–2021 | **Ph.D. in Robotics**, *Clermont Auvergne University (UCA), France; Laval University, Canada*. |
| | Development of a theoretical framework for meaningful risk assessment in occupancy grids. |
| | **Supervisors:** Romuald Aufrère (UCA), François Pomerleau (Laval University), Roland Chapuis (UCA), Christophe Debain (National Research Institute for Agriculture, Food and the Environment) |
| 2017–2018 | **Master Degree in Robotics**, *Clermont Auvergne University*. |
| | Ranked 1/24. |
| 2015–2018 | **Engineering Degree in Computer Science and Modeling**, *Institut Supérieur d'Informatique, de Modélisation et de leurs Applications*. |
| | Ranked 2/120. |

## Professional activities

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| 2021 | **Research Internship**, *Laval University*, Quebec City, Canada, *2 Months*. |
| | Collaboration with the Northern Robotics Laboratory (Norlab), leading to the publications of Baril *et al.* [12] and **J. Laconte** *et al.* [8]. |
| 2021 | **I-SITE IMOBS3 Research Grant representative**. |
| | Ph.D. student representative of the I-SITE Clermont label, granting 10M euros per year for the research institute. |
| 2018–2021 | **Reviewing Services**. |
| | Reviewing of 7 conference papers (ICRA, IROS, ITSC) and 2 journal papers (RA-L). |
| 2018–2021 | **Organization of seminars**. |
| | Organization of various seminars in the research department. |
| 2020 | **Research Internship**, *Laval University*, Quebec City, Canada, *2 Months*. |
| | Collaboration with the Northern Robotics Laboratory (Norlab), leading to the publications of Baril *et al.* [3] and Vaidis *et al.* [7]. |
| 2019 | **Winter School**, *National Institute for Research in Digital Science and Technology (INRIA)*, Sophia Antipolis, France, *1 Week*. |
| | Winter school covering the basics in both mobile and manipulative robotics. |
| 2018 | **Research Internship**, *Laval University*, Quebec City, Canada, *5 Months*. |
| | Investigation of the measurements bias coming from a light detection and ranging (lidar) sensor. Modeling of the return waveform and design of an experimental setup. Lead to the publication of **J. Laconte** *et al.* [2]. |
| 2017 | **Internship**, *Thales*, Elancourt, France, *5 Months*. |
| | Evaluations and improvements of state-of-the-art LIDAR Simultaneous Localization And Mapping (SLAM) algorithms. |

| 2016–2018 | **Robotics Competitions**. |
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| | Took part in several national and international robotics competitions (Robot Challenge, French Robot Cup, *La Nuit du Hack*, *Reconnaissance des Formes et Intelligence Artificielle*) |

## Grants and Distinctions

| 2022 | **Best Ph.D. Thesis Award (2<sup>nd</sup> place)**, *GDR Robotique*. |
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| | French national competition of the best Ph.D. thesis in the field of robotics. |
| 2020 | **Best Robot Vision Paper Award**, *Conference on Robots and Vision (CRV)*. |
| | For the paper: "Evaluation of Skid-Steering Kinematic Models for Subarctic Environments" [3] |
| 2020 | **Finalist for Best Student Paper Award**, *International Conference on Control, Automation, Robotics and Vision (ICARCV)*. |
| | For the paper: "An Information Driven Approach For Ego-Lane Detection Using Lidar And OpenStreetMap" [5] |
| 2018 | **Doctoral Research Grant**, *Innovative Mobility: Smart and Sustainable Solutions (IMOBS3) Program*. |
| 2018 | **Graduate Research Grant**, *WOW! Wide Open to the World Program from I-Site CAP2025 project*. |

## Languages

| **English** | Fluent, TOEIC certificate | **French** | Native Speaker |
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| **Chinese** | Basic Level, HSK2 certificate | **German** | Notions |

## Teaching

| 2018–2021 | **Digital Signal Processing**, *Graduate course*. |
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| | Graduate course about Discrete Fourier Transform, Z transform, signal filtering and their applications. |
| 2018–2021 | **Control Theory**, *Graduate course*. |
| | Graduate course about Laplace transform, regulation, modeling and analysis of continuous systems. |
| 2018–2021 | **Projects Supervision**, *Graduate students*. |
| | Supervision of four robotics graduate projects of 60 or 120 hours per person. |
| 2020 | **Mentoring**, *Ph.D. student*. |
| | Mentoring of several graduate students in various fields of robotics |

## Scientific Publications

[1] **J. Laconte**, C. Debain, R. Chapuis, F. Pomerleau, and R. Aufrère, "Lambda-field: A continuous counterpart of the bayesian occupancy grid for risk assessment," in *2019 International Conference on Intelligent Robots and Systems (IROS)*, 2019, pp. 167–172.

[2] **J. Laconte**, S.-P. Deschênes, M. Labussiere, and F. Pomerleau, "Lidar measurement bias estimation via return waveform modelling in a context of 3d mapping," in *2019 International Conference on Robotics and Automation (ICRA)*, IEEE, 2019, pp. 8100–8106.

[3] D. Baril, V. Grondin, S.-P. Deschênes, **J. Laconte**, M. Vaïdis, V. Kubelka, A. Gallant, P. Giguere, and F. Pomerleau, "Evaluation of skid-steering kinematic models for subarctic environments," in *2020 17th Conference on Computer and Robot Vision (CRV)*, IEEE, 2020, pp. 198–205.

[4] A. Kasmi, **J. Laconte**, R. Aufrère, D. Denis, and R. Chapuis, "End-to-end probabilistic ego-vehicle localization framework," *IEEE Transactions on Intelligent Vehicles*, vol. 6, no. 1, pp. 146–158, 2020.

[5] A. Kasmi, **J. Laconte**, R. Aufrère, R. Theodose, D. Denis, and R. Chapuis, "An information driven approach for ego-lane detection using lidar and openstreetmap," in *2020 16th International Conference on Control, Automation, Robotics and Vision (ICARCV)*, IEEE, 2020, pp. 522–528.

[6] M. Labussière, **J. Laconte**, and F. Pomerleau, "Geometry preserving sampling method based on spectral decomposition for large-scale environments," *Frontiers in Robotics and AI*, vol. 7, 2020.

[7] M. Vaidis, **J. Laconte**, V. Kubelka, and F. Pomerleau, "Improving the iterative closest point algorithm using lie algebra," in *IROS 2020 Workshop: Bringing geometric methods to robot learning, optimization and control*, 2020.

[8] **J. Laconte**, A. Kasmi, R. Aufrère, M. Vaidis, and R. Chapuis, "A Survey of Localization Methods for Autonomous Vehicles in Highway Scenarios," *Sensors*, 2021.

[9] **J. Laconte**, A. Kasmi, F. Pomerleau, R. Chapuis, L. Malaterre, C. Debain, and R. Aufrère, "A novel occupancy mapping framework for risk-aware path planning in unstructured environments," *Sensors*, vol. 21, no. 22, p. 7562, 2021.

[10] **J. Laconte**, E. Randriamiarintsoa, A. Kasmi, F. Pomerleau, R. Chapuis, C. Debain, and R. Aufrère, "Dynamic lambda-field: A counterpart of the bayesian occupancy grid for risk assessment in dynamic environments," in *2021 International Conference on Intelligent Robots and Systems (IROS)*, 2021.

[11] J. Morceaux, **J. Laconte**, E. Randriamiarintsoa, T. Morell, L. Malaterre, D. Denis, R. Aufrère, and R. Chapuis, "Toward a generalized risk assessment method on occupancy grids," in *IROS 2021: Late Breaking Results*, 2021.

[12] D. Baril, S.-P. Deschênes, O. Gamache, M. Vaidis, D. LaRocque, **J. Laconte**, V. Kubelka, P. Giguère, and F. Pomerleau, "Kilometer-scale autonomous navigation in subarctic forests: Challenges and lessons learned," *Field Robotics*, 2022.