

# Christian LAUGIER

## List of Publications (period 2005-2009)

### International Peer-Reviewed Journal Papers

«Incremental Learning of Statistical Motion Patterns with Growing Hidden Markov Models», Vasquez Govea D., Fraichard T., Laugier C. *IEEE Transactions on Intelligent Transportation Systems*, 2009.

«Growing Hidden Markov Models: An incremental Tool for Incremental Learning and Predicting Human and Vehicle Motion», Vasquez D., Fraichard T., Laugier C. *International Journal of Robotics Research*, vol.28, nb.11-12, 2009.

«Geometric and Bayesian Models for Safe Navigation in Dynamic Environments», Laugier C., Vasquez Govea D. A., Yguel M., Fraichard T., Aycard O. *Intelligent Service Robotics*, vol.1, 2008.

«Intentional Motion On-line Learning and Prediction», Vasquez Govea D. A., Fraichard T., Aycard O., Laugier C. *Machine Vision and Applications*, 2008.

«An Efficient Formulation of the Bayesian Occupation Filter for Target Tracking in Dynamic Environments», Tay C., Mekhnacha K., Chen C., Yguel M., Laugier C. *International Journal of Autonomous Vehicles*, 2007.

«Efficient GPU-based Construction of Occupancy Grids Using several Laser Range-finders», Yguel M., Aycard O., Laugier C. *International Journal of Autonomous Vehicles*, 2007.

«Bayesian Occupancy Filtering for Multitarget Tracking: an Automotive Application», Coué C., Pradalier C., Laugier C., Fraichard T., Bessièrè P. *Int. Journal of Robotics Research*, 2006.

«Towards a realistic echographic simulator», D'Aulignac D., Laugier C., Troccaz J., Vieira S. *Journal of Medical Image Analysis*, 2005.

«Navigation among moving obstacles using the NLVO : Principles and applications to Intelligent Vehicles», Large F., Laugier C., Shiller Z. *Autonomous Robots Journal*, 2005.

«The CyCab: a car-like robot navigating autonomously and safely among pedestrians», Pradalier C., Hermosillo J., Koike C., Braillon C., Bessièrè P., Laugier C. *Robotics and Autonomous Systems*, 2005.

### International Peer-Reviewed Conference Papers

«Probabilistic motion planning among moving obstacles following typical motion patterns», Fulgenzi C., Spalanzani A., Laugier C., /RSJ 2009 International Conference on Intelligent Robots and Systems (IROS'09), Saint Louis (USA), 2009.

«Error-Driven Refinement of Multi-scale Gaussian Maps. Application to 3D Multi-scale map Building, Compression and Merging», 14<sup>th</sup> International Symposium of Robotics Research (ISRR'09), Zurich, 2009.

«Frame Rate Object Extraction from Video Sequences with Self Organizing Networks and Statistical Background Detection», Craesmeyer Bellardi T., Vasquez Govea D. A., Laugier C., IEEE/RSJ 2008 International Conference on Intelligent Robots and Systems (IROS'08), Nice (France), 2008.

«Probabilistic navigation in dynamic environment using Rapidly-exploring Random Trees and Gaussian Processes», Fulgenzi C., Tay C., Spalanzani A., Laugier C., Workshop on safe Navigation,

IEEE/RSJ 2008 International Conference on Intelligent Robots and Systems (IROS'08), Nice (France), 2008.

«Bayesian occupancy filter based "Fast Clustering-Tracking" algorithm», Mekhnacha K., Mao Y., Raulo D., Laugier C., Workshop on safe Navigation, IEEE/RSJ IROS 2008, Nice (France), 2008.

«The "Fast Clustering-Tracking" algorithm in the Bayesian occupancy Filter framework», Mekhnacha K., Mao Y., Raulo D., Laugier C., International Conference MFI 2008 Seoul (Korea), 2008.

«Scale Invariant Detection and Tracking of Elongated Structures», Nègre A., Crowley J. L., Laugier C., Proc. of the Int. Symp. on Experimental Robotics (ISER'08), Athen (Greece), 2008.

«Bayesian Models for Multimodal Perception of 3D Structure and Motion», Ferreira J.F., Bessièrè P., Mekhnacha K., Lobo J., Dias J., Laugier C., International Conference on Cognitive Systems (CogSys 2008), Karlsruhe (Germany), 2008.

«Combining Probabilistic Velocity Obstacles and Occupancy Grid for safe Navigation in dynamic environments», Fulgenzi C., Spalanzani A., Laugier C., Workshop on safe Navigation, IEEE ICRA'07, Rome (Italy), 2007.

«Dynamic Obstacle Avoidance in uncertain environment combining PVOs and Occupancy Grid», Fulgenzi C., Spalanzani A., Laugier C., Proc. of the IEEE Int. Conf. on Robotics and Automation (ICRA'07), Rome (Italy), 2007.

«Modelling Smooth Paths Using Gaussian Processes», Tay C., Laugier C., Proc. of the Int. Conf. on Field and Service Robotics (FSR'07), Chamonix (France), 2007.

«Incremental Learning of Statistical Motion Patterns with Growing Hidden Markov Models», Vasquez Govea D., Fraichard T., Laugier C., Int. Symp. of Robotics Research (ISRR'07), Hiroshima (Japan), 2007.

«Update Policy of Dense Maps: efficient algorithms and sparse representation», Yguel M., Aycard O., Laugier C., 6th International Conference Field and Service Robotics (FSR'07), Chamonix (France), 2007.

«PUVAME - New French Approach for Vulnerable Road Users Safety», Aycard O., Spalanzani A., Yguel M., Burlet J., Du Lac N., De La Fortelle A., Fraichard T., Ghorayeb H., Kais M., Laugier C., Laugeau C., Michel G., Raulo D., Steux B., (2006) Proc. of the IEEE Intelligent Vehicle Symposium (IEEE IV'06), Tokyo (JP), 2006.

«Real-time stereo and optical flow data fusion», Braillon C., Usher K., Pradalier C., Crowley J., Laugier C., Proc. of the IEEE-RSJ Int. Conf. on Intelligent Robots and Systems (IROS'06), Beijing (China), 2006.

«Real-time Moving Obstacle Detection Using Optical Flow Models», Braillon C., Pradalier C., Crowley J., Laugier C., Proc. of the IEEE Intelligent Vehicle Symposium (IEEE IV'06), Tokyo (JP), 2006.

«Occupancy grids from stereo and optical flow data», Braillon C., Pradalier C., Usher K., Crowley J., Laugier C., Proc. of the Int. Symp. on Experimental Robotics (ISER'06), Rio de Janeiro (Brazil), 2006.

«Fusion of stereo and optical flow data using occupancy grids», Braillon C., Usher K., Pradalier C., Crowley J., Laugier C., Proc. of the IEEE Int. Conf. on Intelligent Transportation Systems (ITSC'06), Toronto (Canada), 2006.

«Adaptive Interactive Multiple Models applied on pedestrian tracking in car parks», Burlet J., Aycard O., Spalanzani A., Laugier C., Proc. of the IEEE-RSJ Int. Conf. on Intelligent Robots and Systems (IROS'06), Beijing (China), 2006.

«Pedestrian tracking in car parks: an Adaptive Interacting Multiple Model based Filtering Method», Burlet J., Aycard O., Spalanzani A., Laugier C., Proc. of the IEEE Int. Conf. on Intelligent Transportation Systems (ITSC'06), Toronto (Canada), 2006.

«Dynamic environment modeling with gridmap: a multiple-object tracking application», Chen C., Tay C., Mekhnacha K., Laugier C., Proc. of the Int. Conf. on Control, Automation, Robotics and Vision (ICARCV'06), Singapore, 2006.

«Real-time Time-To-Collision from variation of Intrinsic Scale», Negre A., Braillon C., Crowley J., Laugier C., Proc. of the Int. Symp. on Experimental Robotics (ISER'06), Rio de Janeiro (BR), 2006.

«Online Reconstruction of Vehicles in a Car Park», Tay C., Pradalier C., Laugier C., International Conference on Field and Service Robotics (FSR'05), Port Douglas (Australia), 2005.

«Fast Object Extraction from Bayesian Occupancy Grids Using Self Organizing Networks», Vasquez Govea D. A., Romanelli F., Fraichard T., Laugier C., Proc. of the Int. Conf. on Control, Automation, Robotics and Vision (ICARCV'06), Singapore, 2006.

«Efficient GPU-based Construction of Occupancy Grids Using several Laser Range-finders», Yguel M., Aycard O., Laugier C., Proc. of the IEEE-RSJ Int. Conf. on Intelligent Robots and Systems (IROS'06), Beijing (China), 2006.

«Grid based fusion of off-board cameras», Yguel M., Aycard O., Raulo D., Laugier C., Proc. of the IEEE Intelligent Vehicle Symposium (IV'06), Tokyo (Japan), 2006.

«Steps towards safe navigation in open and dynamic environments», Laugier C., Petti S., Vasquez Govea D. A., Yguel M., Fraichard T., Aycard O., Proc. of the IEEE ICRA'05 Workshop on Autonomous Navigation in Dynamic Environments Barcelona (ES), 2005.

«Vehicle Detection and Car Park Mapping Using Laser Scanner», Tay C., Pradalier C., Laugier C., Proc. of the IEEE-RSJ Int. Conf. on Intelligent Robots and Systems (IROS'05), Edmonton (Canada), 2005.

«Intentional Motion On-line Learning and Prediction», Vasquez Govea D. A., Fraichard T., Aycard O., Laugier C., Proc. of the Int. Conf. on Field and Service Robotics (FSR'05), Port Douglas (Australia), 2005.

«Wavelet Occupancy Grids: a Method for Compact Map Building», Yguel M., Aycard O., Laugier C., Proc. of the Int. Conf. on Field and Service Robotics (FSR'05), Port Douglas (Australia), 2005.

## **Book Chapters**

«The Bayesian Occupation Filter», Tay M.K., Mekhnacha K., Yguel M., Coué C., Pradalier C., Laugier C., Fraichard T., Bessière P., *Book "Probabilistic Reasoning and Decision Making in Sensory-Motor Systems"*, Edited by P. Bessiere, C. Laugier, R. Siegwart, Springer-Verlag, 2008.

« Steps Towards Safe Navigation in Open and Dynamic Environments », Laugier C., Vasquez D., Yguel M., Fraichard Th., Aycard O., *Book "Autonomous navigation in dynamic environments"*, Edited by C. Laugier and R. Chatila, Springer-Verlag, 2007.

## **Publication of Books, Journal Special issues, and Proceedings**

**Book** «Autonomous Navigation in Dynamic Environments», Laugier C., Chatila R., Springer-Verlag (2007).

**Book** «Probabilistic Reasoning and Decision Making in Sensory-Motor Systems», Bessière P., Laugier C., Siegwart R., Springer-Verlag (2008).

International Journal on Advanced Robotics (IJAR). **Special Issue** on “Intelligent Robots and Systems”, Laugier C., Asama H., Sugano S., Vol. 23, no. 15, 2009.

IEEE Trans. on Intelligent Transportation Systems (IEEE-ITS). **Special issue** on “Perception and Navigation for Autonomous Vehicles”, Laugier C., Nunes U., Broggi A., 2009.

The International Journal of Robotics Research (IJRR) - **Special issue** on “Field and Service Robotics”, Laugier C., Martinelli A., Pradalier C., Siegwart R., vol.28, nb. 2, 2009.

Journal of Field Robotics - **Special Issue** on “Field and Service Robotics (JFR)”, Pradalier C., Martinelli A., Laugier C., Siegwart R., vol. 25, Issue 6-7, 2008.

International Journal of Vehicle and Autonomous Systems (IJVAS). **Special Issue** on “Advances in Autonomous Vehicle Technologies for Urban Environment”, Wang D., Ge S. S., Laugier C., 2008.

**Proceedings** “6<sup>th</sup> International Conference on Field and Service Robotics 2007”, Edited by C. Laugier and R. Siegwart, Springer Verlag, 2008.

**Proceedings** “IEEE/RSJ International Conference on Intelligent Robots and Systems 2008”, Edited by Merlet J.-P., Chatila R., Laugier C., 2008.

## **Technical reports**

«Velocity Estimation on the Bayesian Occupancy Filter for Multi-Target Tracking», Yguel M., Tay C., Mekhnacha K., Laugier C., INRIA Research Report, no.17, 2006.

## **Invited talks**

“Human, Dynamic and Open Environments: A new Challenge for Robotics”, C. Laugier, Keynote talk, International Conference on Field and Service Robotics 2009 (**FSR’09**), MIT Cambridge, July 2009.

“Robots in Human Environments. The Intelligent Vehicle Context”, C. Laugier, Keynote talk, Conference on Autonomous Mobile Systems 2009 (**AMS’09**), Karlsruhe, December 2009.

“Towards Robots in Human Environments”, Plenary panel on “Present and Future of Robotics”, **ICARCV’08**, Hanoi, December 2008.

“Perception-based Navigation for Autonomous Vehicles in Open and Dynamic Environments”, C. Laugier, **Co-mobility Workshop**, Tokyo, January 2008.

“Key Technologies for Intelligent Vehicle”, C. Laugier, **Nagoya University**, December 2009.

“Bayesian Approach for Safe Navigation in Open and Dynamic Environments”, C. Laugier, **Tokyo University**, December 2007.

## **Patents**

Patent “Risk 1: Vehicle Driving Assistance and related processes”, Patent no. 0552735, Sept. 2005.  
Authors: C. Coue, C. Laugier, P. Bessiere, T. Fraichard.

Patent “Risk 2: Vehicle Driving Assistance and related processes”, Patent no. 0552736, Sept. 2005.  
Authors: M. Yguel, C. Laugier, K. Mekhnacha. Patent extended to Asian countries in 2008.

Patent “Vehicle or Traffic Control Method and System”, Patent no. 09169060.2 – 1264, August 2009.  
Patent registered with Toyota Europe. Authors: C. Laugier, C. Tay, K. Mekhnacha.