Dr. Dominique Gruyer | Senior Research Director (DR 1) in PICS-L laboratory University Gustave Eiffel, IFSTTAR, department COSYS
1 – IFSTTAR-UGE building – 25 allée des Marronniers, office 52 – 78000 Versailles – Satory
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# Academic background

Habilitation to Manage Research (HDR) Data Fusion : from environment perception to the cooperative systems University of Evry Val d'Essonne, Option "Control Theory", France	28 February 2014
<b>PhD.</b> In Systems Control (highly commended mention) Study of the imperfect data processing for the multi-target tracking: Applied to the road situations University of Technology of Compiègne, France	02 December 1999
Master's degree In Systems Control University of Technology of Compiègne, France	September 1995

# **Research activities**

<b>Deputy Director</b> of the COSYS department for <b>"Autonomous and Connected Vehicle"</b> <b>Manager</b> of the JESTTAP's research program <b>"Autonomous and Connected Vehicle"</b>	<sup>7</sup> from 01/2019 to now from 06/2018 to now
Head of the LIVIC laboratory department COSVS (ESTTAR / Evence)	$f_{rom} 01/2015 to 12/2010$
<b>Head</b> of the <b>Livic</b> laboratory, department COSTS, IFSTTAR (5 years)	
Scientific Director « perception and data fusion » in ESI-group (CIVITEC)	from 04/2015 to now
Senior Research Director in Univ. Eiffel (equivalent senior full professor)	from 01/2020 to now
Senior Research Director in IFSTTAR (equivalent senior full professor)	from 01/2019 to 12/2019
Research Director in IFSTTAR (equivalent full professor)	from 10/2014 to 12/2018
Scientific Expert and co-founder for the CIVITEC company (start-up IFSTTAR)	from 2009 to 2012
Senior researcher and team leader	from 2006 to 2014
Researcher in INRETS	from 2001 to 2005

**Research fields:** Autonomous vehicle, cooperative systems, ego-localization, environment perception, extended perception, sensors simulation for ADAS prototyping, risk assessment, AI for autonomous driving, failure detection and recognition.

Research skills: multi-sensor data fusion, belief theory, theories of uncertainties, theory of estimation.

# Research valorization and supervising (Google scholar H index: 32)

Journal papers with peer-review process:						47						
Journal papers v	vithout peer-revie	w proces	S							5		
International conferences with peer-review and proceedings:						168						
French conferences with reviewers and proceedings:						14						
Invited conferer	nces and seminars									46		
Books chapters:										14		
<b>Research report</b>	<b>s</b> (French and inte	rnationa	)							59		
Popularisations	and interviews									35		
Patents, License	agreements:									8		
Start-up: CIVITE	C (now a subsidiar	y of ESI g	roup)							1		
Search terms	Source	Papers	Cites	Cites/year	h	g	hl,norm	hl,annual	hA	acc10	Search date	Cačhe date
✓ Dominique Gruyer	G Google Scholar	245	4773	207.52	32	62	18	0.78	12	14	10/04/2022	10/04/2022

Post Doctorate:	7
PhD thesis:	14 defended,
(1 co-tutelle, 1 ITEP, 1 IFSTTAR with LEOST, 1 associated with UBC-Canada, 1 CEREMA-U	JGE) <b>5</b> in progress
Master/engineer internships:	35
Research engineers (short term contract):	18

# Involvement in juries, authorities, and committees

Involvement in PhD thesis juries:	35
Involvement in HDR thesis juries:	2

**Involvement in Scientific committees** 

- Expert for BPI. Expertise and review of project in the call "PIA4 Mobilités routières automatisées", 2022.
- **Committee Member of HCERES** for the evaluation of LITIS laboratory in Rouen (July 2021 December 2021; evaluation 19-21 October 2021)
- Committee Member of the Burgundy University Selection Advisory Commission, engineer school ISAT (NEVER), laboratory DRIVE. May 2021.
- International expert for Austrian project calls (Austrian Research Promotion Agency): Oct 2020 to Nov 2020 : Reviewer for FuE-Infrastrukurförderung, Fachbegutachtung 3.AS Austrian research pro-motion agency (FFG) Reviewer for the "COMET-projects": project ESSENSE-AD (European Set of Referenced Perception Sensor Data for Empowering Automated Driving).
- Sciences and Technologies faculty committee of University Evry Val d'Essonne (from 2019)
- Member of the scientific domain 2 committee (Communication and autonomous vehicles) of VEDECOM (from 2018)
- Committee of experts (Selection Advisory Commission) for Mines Paris Tech in 2018
- **Committee member** of the Paris-Saclay doctoral school (domain 1: Information and Communication Sciences and Technologies) from 2017 to 2019.
- Scientific committee of the ADAS group from June 2016 (group of companies working on the development of cooperative and active ADAS for road safety)
- Nominated member of the CS (Committee of experts) 61st section of the University Paris Sud XI Orsay from 2004 to 2006, 2008-2009
- Member of the CCSU (University Selection Advisory Commission) 61st commission section of the University Paris Sud XI Orsay in 2011 to 2013, the University of Evry Val d'Essonne in 2012, and the INSA Rouen Commission in 2012.
- International expert for AUTO21, Canada (from 2010 to 2014)

### Involvement in editorial committees and conference committees:

2012:	RFIA-VISAGE Program Committee ( <u>http://visage.univ-bpclermont.fr</u> )
<b>2013</b> :	Editorial committee for the special issue IJNCS 2013 in the Journal of Intelligent Systems.
2013-now:	International Committee and Associate Editor for the International IEEE Intelligent Vehicle
	Symposium (IV).
2018:	Member of the International Committee and Associate Editor of the IEEE ITSC conference
2016:	Member of the International Committee and Associate Editor of the IFAC / IEEE CPHS Conference (Florianopolis, December 2016, Brazil)
2018-2020:	Guest editor for the special issue "Sensors data fusion", journal SENSORS
2020-now:	Guest editor for the special issue "Sensors and Sensor Fusion for Future Mobility Systems", journal SENSORS
2019-now:	Member of the editorial board of the journal SENSORS
2023:	Member of the scientific committee for the future conference IEEE Models and Technologies for ITS (MT-ITS), 2023 in Nice, France.

### Projects, contracts, and expertise

Projects:	12 (French), 11 (European), 2 (International: Canada and Australia)
Contracts:	>8 (Renault, FAAR, Transdev, ESI, VEDECOM, CTA, Alstom)
Expertises:	>10 (Fujitsu, Renault, DGA, ANR, ANRT, BPI, ESI-CIVITEC, VEDECOM, DGITM, CGEDD)

# Awards

1999: highly commended mention for the PhD thesis (only 10% of the French PhD thesis) 2011-2015: Award of Scientific Excellence (PES) awarded by INRETS in 2011 for 4 years

- 2 journal papers and 4 international conference papers have been nominated or awarded:
- Jamil Fayyad, Mohammad Jaradat, Dominique Gruyer, and Homayoun Najjaran, « Deep Learning Sensor Fusion for Autonomous Vehicles Perception and Localization: A Review.", in SENSORS journal for the special issue « Sensor Data Fusion for Autonomous and Connected Driving", 2020. Nominated for 2020 best paper award.
- L. Rivoirard, M. Wahl, P. Sondi, M. Berbineau, and D. Gruyer, "CBL: A Clustering Scheme for VANETs." in • The 6th International Conference on Advances in Vehicular Systems, Technologies and Applications (VEHICULAR 2017), July 23 - 27, 2017 - Nice, France. Best paper award
- D. Gruyer, S. Demmel, B. d'Andrea-Novel, G. Larue, A. Rakotonirainy, « Simulating Cooperative Systems Applications: a New Complete Architecture", in International Journal of Advanced Computer Science and Applications (IJACSA), Volume 4, 2013. (Best paper award for Volume 4, 2013)
- S. Glaser B. Vanholme, S. Mammar, D. Gruyer, "Probability and risk maneuver planning for collision avoidance", in FAST-ZERO (Future Active Safety Technology) 2011, Tokyo, Japan, September 5-9, 2011. (nominated for the best paper award)
- A. Ndjeng Ndjeng, A. Lambert, D. Gruyer and S. Glaser, "Experimental Comparison of Kalman filters for vehicle localization", In Proceedings IEEE international Symposium on Intelligent Vehicles (IV'09), Xi'an Shaanxi, China, 3-5 june 2009. (nominated for the best poster award)
- A. Lambert, D. Gruyer, B. Vincke, E. Seignez, « Outdoor Vehicle Localization by Bounded-Error Sate Estimation", in IROS'09, October 2009, Saint Louis, USA. (Award for Finalist of the best paper award).

# Main international activities

Queensland University of technology (Brisbane, Australia), lab CARRS-Q from 2004 to now Common project (FAST), PhD co-tutelles, journal and conference papers, building of a LIA (Associated International Laboratory) in progress (submission in March 2022)

University of Sherbrooke (Sherbrooke, Canada), lab LIV from 2009 to now Common project (CooPerCom), co-supervising of 3 PhD thesis, journal and conference papers, AUTO21 international expert (from 2010 to 2014)

## University of Tongji (Shanghai, China)

from 2016 to now High End Foreign Expert in China (2016, 2018, 2019), Foreign expert and invited professor (2017), journal papers, Cai Yuan Pei (2018-2021, 1 PhD thesis in co-tutelle), teachings and seminars ...

University of British Columbia (Kelowna, Canada), lab ACIS Associated PhD thesis, student hosting, invited professor, journal and conference papers, seminar ...

## Austrian research promotion agency (FFG)

International Expert Austrian project calls: Reviewer for FuE-Infrastrukurförderung, Fachbegutachtung 3.AS -Austrian research promotion agency (FFG). COMET-projects call.

# **Teaching activities**

## UTEC, University of Technology and consular teaching,

Chamber of Commerce and Industry of Meaux-Melun 2000: computer science, Digital electronic, Algorithmic, Computer architecture

### University of Technology of Compiègne (engineer degree)

1995-2003: Human/Machine communication, AI and problem solving, Virtual Reality, Computer sciences, Digital electronic and microprocessor, introduction to programming, compilation techniques

### University Paris XI (Orsay)

## (engineer and master degree)

(Le) (Tu) (La) 2013-2015: "simulation of autonomous systems", responsible of the module, POLYTECH Paris Sud. 2002-2013: « Data fusion for the obstacles detection and tracking ». Master SETI (Electronic System and data processing).

## from 2016 to now

## from 2020 to now

# (Le) (Tu) (La)

(Le) (Tu) (La)

2005-2021: Teaching in the MAREVA op	tion (Vision, morphology, Robotic and cont	rol theory).
University Evry Val d'Essonne 2016-2022: responsible of the module « Systems »	(master degree) Localisation, map, path planning », master	<b>(Le) (Tu) (La)</b> r « Mobil Autonomous
<b>2020-2022</b> : «Extended perception», mas <b>2005-2012</b> : « The technics of data fusior systems).	ster « Mobil Autonomous Systems ». n for the embedded ego-positioning », Mas	(Le) (Tu) ter RVSI (VR and intelligent (Le) (Tu) (La)
IFP SCHOOL 2018-2022: module PowerTrain, "Close a sensors and data imperfections".	(master degree) and Far perception: A key issue Manageme	<b>(Le)</b> nt, Processing and Fusion of
ENSTA 2019-2021: module « Localisation/map/ Electrical Infrastructure, Electrical Vehicl	(master degree) path planning» in the specialized master « les, and Autonomous Vehicles » (IRVEA).	(Le)(La) Project management in
Tongji University (China) 2016: Lectures 1, 2 and 3: From the conr Methods, and applications "Close and Far perception: A key issue. N 2018: Lectures 1, « Is autonomous drivin issues. Benefits and weakness"	(Post graduate: master and PhD) nected and perceptive vehicle toward the a Management, Processing and Fusion of sens ng the silver bullet for safety, consumption,	(Le) nutonomous car. Issue, sors and data imperfections" and traffic congestion
2021: 6 lectures about automated vehicl	les, perception systems, multi-sensor fusion	n, cooperative systems
Changsha University of Science & Techr 2018: Lecture in the school of traffic & tr safety, consumption, and traffic congest	<b>nology</b> (Post graduate : master and Pl ransportation engineering, « Is autonomou ion issues. Benefits and weakness".	hD) (Le) s driving the silver bullet for

(engineer)

Languages	
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French: mother tongue

National school of Mines de Paris

English: fluent

Chinese: A1.1 level

(La)

# Some relevant publications about my research

Olivier Orfila, **Dominique Gruyer**, et Rémi Sainct, « Automated Driving, a Question of Trajectory Planning », chapitre 3 de l'ouvrage "From AI to Autonomous and Connected Vehicles, Advanced Driver-Assistance Systems (ADAS)". Bapin, T. and Bensrhair, A. (eds.) (2021). ISTE Ltd., London, and John Wiley and Sons, New York. Série : Digital Science. ISBN: 9781786307279, Publication Date: August 2021, Hardcover 284 pp. http://iste.co.uk/book.php?id=1800

**Dominique Gruyer**, Serge Laverdure, Jean-Sébastien Berthy, Philippe Desouza, Mokrane Hadj-Bachir, «From Virtual to Real, How to Prototype, Test, Evaluate and Validate ADAS for the Automated and Connected Vehicle? », chapitre 4 de l'ouvrage "From AI to Autonomous and Connected Vehicles, Advanced Driver-Assistance Systems (ADAS)". Bapin, T. and Bensrhair, A. (eds.) (2021). ISTE Ltd., London, and John Wiley and Sons, New York. Série: Digital Science. ISBN: 9781786307279, Publication Date: August 2021, Hardcover 284 pp. http://iste.co.uk/book.php?id=1800

Wei Xu, Rémi Sainct, **Dominique Gruyer**, Olivier Orfila, « Safe vehicle trajectory planning in an autonomous decision support framework for emergency situations. », in Applied Sciences journal, Special Issue "Human-Computer Interaction: Theory and Practice". Published 09th July 2021. Appl. Sci.2021,11, 6373. https://doi.org/10.3390/app1114637, Impact Factor: 2.679

**Dominique Gruyer**, Olivier Orfila, Sébastien Glaser, Abdelmename Hedhli, Nicolas Hautière and Andry Rakotonirain, "Are Connected and Autonomous Vehicles the silver bullet for future transportation issues? Benefits and weaknesses on Safety, Consumption, and Traffic congestion.", in Frontiers in Sustainable Cities, Special Collection "Advances in Road Safety Planning", 8<sup>th</sup> January 2021.

Jamil Fayyad, Mohammad Jaradat, **Dominique Gruyer**, and Homayoun Najjaran, « Deep Learning Sensor Fusion for Autonomous Vehicles Perception and Localization: A Review.", in SENSORS journal for the special issue « Sensor Data Fusion for Autonomous and Connected Driving". Volume 20, issue 15. Published 29th July 2020. DOI: <a href="https://doi.org/10.3390/s20154220">https://doi.org/10.3390/s20154220</a>, Impact factor: 3.275

Farid Bounini, Denis Gingras, Hervé Pollard, **Dominique Gruyer**, "From Simultaneous Localization And Mapping to Collaborative Localization for Intelligent Vehicles", in IEEE Intelligent Transportation Systems Magazine, 3th March 2020. 10.1109/MITS.2019.2926368. Impact factor: 3.294

Meiting TU, Wenxiang Li, Minchao TU, Olivier Orfila, **Dominique Gruyer**, « Improving Ridesplitting Services Using Optimization Procedures on a Shareability Network: A Case Study of Chengdu", in Journal "Technological Forecasting & Social Change", Accepted 29th August 2019. CiteScore: 4.32, *Impact Factor: 3.815*.

Laurène Claussmann, Marc Revilloud, **Dominique Gruyer**, and Sébastien Glaser, "A Review of Motion Planning for Highway Autonomous Driving", in IEEE Transactions on Intelligent Transportation Systems pp(99):1-23, DOI: 10.1109/TITS.2019.2913998, May 2019. *Impact factor: 5.744*.

Xuanpeng Li, Dong Wang, Huanxuan Ao, Rachid Belaroussi, **Dominique Gruyer**, « Fast 3D Semantic Mapping in Road Scenes.", in Applied Sciences 9(4):631. February 2019. DOI: 10.3390/app9040631. *Impact Factor: 1.689* 

Jessica Van Brummelen, Marie O'Brien, **Dominique Gruyer**, and Homayoun Najjaran, "Autonomous Vehicle Perception: The Technology of Today and Tomorrow", in Transportation Research Part C: Emerging technologies. February 2018. *Impact Factor: 3.805* 

Lucas Rivoirard, Martine Wahl, Patrick Sondi, Marion Berbineau, **Dominique Gruyer**, "Chain-Branch-Leaf: A clustering scheme for vehicular networks using only V2V communications." in Ad Hoc Networks (2017), Volume 67, December 2017, Elsevier, https://doi.org/10.1016/j.adhoc.2017.10.007. *Impact Factor: 3.047* 

**Dominique Gruyer**, Valentin Magnier, Karima Hamdi, Laurène Claussmann, Olivier Orfila, Andry Rakotonirainy, "Perception, information processing and modeling: critical stages for autonomous driving applications », in Annual Reviews in Control, volume 44, pages 323-341, November 2017. *Impact Factor: 2.627* 

Olivier Orfila, **Dominique Gruyer**, Karima Hamdi, Sébastien Glaser, , "Safe and Ecological Speed Profile Planning Algorithm for Autonomous Vehicles Using a Parametric Multiobjective Optimization Procedure", accepted in the fourth international symposium on Future Active Safety Technology (FAST-ZERO 2017), Nara Kasugano International Forum, Nara, Japan, 18-22 September 2017

Olivier Orfila, Camila Freitas Salgueiredo, Guillaume Saint Pierre, Haihao Sun,Ye Li, **Dominique Gruyer**, Sébastien Glaser, "Fast computing and approximate fuel consumption modeling for Internal Combustion Engine passenger cars", in Transportation Research Part D: Transport and Environment, Elsevier, Volume 50, January 2017, Pages 14–25. *Impact Factor: 2.341* 

**Dominique Gruyer**, Ines Ben Jemaa, Sebastien Glaser, Philippe Desouza, Jean-Sebastien Barreiro, Serge Laverdure « Simulation Platform for the Prototyping, Testing, and Validation of Cooperative Intelligent Transportation Systems. », 23rd ITS World Congress, Melbourne, Australia, 10–14 October 2016.

**Dominique Gruyer**, Sébastien Demmel, Valentin Magnier, Rachid Belaroussi, « Multi-Hypotheses Tracking using the Dempster–Shafer Theory, application to ambiguous road context.", in Information Fusion, Elsevier, Volume 29, May 2016, Pages 40-56. DOI: 10.1016/j.inffus.2015.10.001. *Impact Factor: 3.681* 

**Dominique Gruyer**, Sébastien Demmel, Brigitte d'Andrea-Novel, Grégoire Larue, Andry Rakotonirainy, « Simulating Cooperative Systems Applications: a New Complete Architecture", in International Journal of Advanced Computer Science and Applications (IJACSA), Volume 4, 2013. (**Best paper award for Volume 4, 2013**) *Impact Factor: 1.32* 

Benoit Vanholme, **Dominique Gruyer**, Benoit Lusetti, Sebastien Glaser, Said Mammar, "Highly automated driving on highways based on legal safety", in IEEE Transaction on Intelligent Transportation Systems, No 14 (1), pp 333-347, 2013. *Impact Factor: 2.472*