

German Ros

Sr. Research Manager and Lab lead

Contact details

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Google scholar: <https://scholar.google.es/citations?user=-qGCJfsAAAAJ&hl=en>.

Managerial and lead roles

- 2021–Present **Autonomous Agents Lab**, *Intel*, Autonomous Agents, Sim-to-Real, Lab lead.
<http://www.intel.com>
- 2019–2020 **Advanced simulation infrastructure for AD**, *Intel-GM*, Collaboration with General Motors, Program lead.
- 2017–Present **CARLA simulation team**, *Intel*, Simulation for Autonomous Driving, Program lead.
<http://carla.org>
- 2018–Present **Open3D**, *Intel*, 3D library for perception, reconstruction, visualization and meshing, Program lead.
<http://www.open3d.org/>
- 2017–2018 **Simulation tools**, *Toyota Research Institute*, Distributed Simulation for Autonomous Driving, Project manager.
- 2016 **Simulation platform for 3D semantic mapping**, *CVC-Yandex*, Advance techniques for real-time mapping, Technical lead.
- 2016 **The SYNTHIA Virtual Environment**, *CVC*, A virtual world to train autonomous vehicles, Tech lead.
<http://synthia-dataset.net>

Individual contributor roles

- 2021–Present **Sr. Staff Scientist**, *Intel Labs*, Emergent AI Research, Santa Clara, CA.
Simulation for AI, Autonomous Systems
- 2018–2021 **Research Scientist**, *Intel Labs*, Intelligent Systems Labs, Santa Clara, CA.
Simulation for Machine learning, Machine learning for Autonomous Systems
- 2016–2018 **Research Scientist**, *Toyota Research Institute*, Machine Intelligence group, Los Altos, CA.
Simulation for Machine learning, Machine learning for Scene Understanding
- 2016 **Research intern**, *Toshiba Research & Development Center*, Interactive and Media Laboratory, Automotive division, Kawasaki, Japan.
Novel Training methods for Deconvolutional Networks; under the supervision of Dr. Watanabe-san
- 2015 **Research intern**, *Toshiba Research Lab Cambridge*, Cambridge, UK.
Deep Semantic Segmentation for Driverless cars; under the supervision of Dr. Pablo Alcantarilla and Dr. Bjorn Stenger
- 2015 **Research engineer**, *CVC-Volkswagen*, Recognition systems for urban environments, Barcelona, Spain.
- 2014–2016 **Research collaborator**, *Applied Mathematics Group*, University of Murcia, Spain.
Manifold Optimization techniques for Robust Decompositions; Regular collaboration with Dr. Julio Guerrero
- 2014 **Research visitor**, *Universite Catholique de Louvain (UCL)*, Louvain, Belgium.
Short visit hosted by Dr. Laurent Jacques
- 2013–2016 **Research engineer**, *CVC*, Vision-only powered Autonomous Driving car, (scene understanding).
Barcelona, Spain

- 2013–2014 **Research visitor**, *NICTA, Canberra Research Lab*, Canberra, Australia.
Robust Decompositions for Outlier Detection in Urban Visual Odometry; under the supervision of Dr. Jose Alvarez
- 2013 **Research visitor**, *Institute of Measurement and Control Technology (MRT)*, Karlsruhe Institute of Technology, Karlsruhe, Germany.
Robust Lie-Averaging for Fast pose Initialization; under the supervision of Prof. Christoph Stiller
- 2010–2011 **Research visitor**, *Robotic Vision Team*, Kingston University, London, UK.
Visual SLAM for indoors Robots; under the supervision of Prof. Paolo Remagnino
- 2010–2011 **Research visitor**, *Human Body Motion Group*, Kingston University, London, UK.
Fully Articulated Pose-hand Recovery; under the supervision of Dr. Jesus Martinez-del-Rincon

Interests

- Autonomous Agents** Learning methods for Autonomous cars, Simulation for verification Semantic segmentation, self-localization
- Machine Learning** Deep Learning, Unsupervised learning, Synthetic data, Generative methods, Virtual Worlds for automatic labelled data generation, Domain Adaptation
- Applied Mathematics** Robust estimation, Continuous optimization, Riemannian optimization
- Computer Vision** Visual geometry, Semantic labelling, Obstacle detection

Education

- 2011–Sept 2016 **PhD in Computer Vision (Cum Laude, International Doctor)**, *Computer Vision Center – Universitat Autònoma de Barcelona*, Spain.
- 2011–2012 **MSc in Computer Vision and Artificial Intelligence**, *Universitat Autònoma de Barcelona*, Spain.
- 2010–2011 **MSc in Computer Vision and Image Analysis**, *Kingston University of London*, UK, *1st class*.
- 2005–2010 **BSc in Computer Science (Hons.)**, *University of Murcia*, Spain, *1st class*.

Patents

- 2018 **Inferring 3D Objects in Scenes**, *Granted*, Toyota Research Institute.
- 2018 **Mathematical Manifold View of Spaces**, *Granted*, Toyota Research Institute.
- 2018 **Virtually-Boosted Training**, *Granted*, Toyota Research Institute.
- 2018 **ForestGAN: Hierarchical Generative Adversarial Networks**, *Pending*, Toyota Research Institute.
- 2018 **Photorealistic Simulation Using Conditional VAE-GANs and Low-Quality Simulation**, *Pending*, Toyota Research Institute.
- 2018 **System and Method for System-Aware Classifiers**, *Granted*, Toyota Research Institute.
- 2018 **Efficient Algorithms and System for Full-stack verification of Autonomous Agents**, *Granted*, Toyota Research Institute.
- 2016 **Training constrained deconvolutional networks for road scene semantic segmentation**, *Granted*, Toshiba Research Corporation.

Skills & Tools

- Computer Science** Simulation, Agile development
- Machine Learning** CNNs, Virtual worlds, Transfer Learning, Network compression
- Optimization** Continuous optimization, Constrained optimization, Riemannian optimization
- Programming** C/C++, Python, MATLAB, Java
- Frameworks** Pytorch, TensorFlow, Chainer

Engines Unity3D, Unreal Engine 4, Blender

Teaching Experience

- 2017 **Lecturer, MSc in Machine Learning**, *Universitat Autònoma de Barcelona*, Barcelona, Spain.
2012–2013 **T.A., Machine Learning**, *ETSE, Universitat Autònoma de Barcelona*, Barcelona, Spain.
2013–2014 **T.A., Machine Learning**, *ETSE, Universitat Autònoma de Barcelona*, Barcelona, Spain.
2014–2015 **T.A., Data Structures**, *ETSE, Universitat Autònoma de Barcelona*, Barcelona, Spain.
2014–2015 **T.A., Artificial Intelligence**, *ETSE, Universitat Autònoma de Barcelona*, Barcelona, Spain.
2015–2016 **Author, Online Course of Hands-on Deep Learning with MatConvNet**, Online.

Languages

Spanish Native
English Proficient user
Catalan Basic user
Japanese Basic user

Awards & Honours

- 2016 **Honors, Cum Laude PhD Thesis**, *Barcelona, Spain*.
2016 **Finalist for Best System Paper Award at the Robotics Science and Systems (RSS) conference**, *Award given by the RSS consortium to outstanding systems papers presented at the RSS conference.*, Michigan, USA.
2011 **Best industrial IT project of the year**, *Award given by the IT consortium, TIMUR*, Spain.
2010 **Top student of Computer Science**, *Promotion 2005–2010*, Murcia, Spain.
2010 **Honourable mention Computer Science, 1st class**, *Promotion 2005–2010*, Murcia, Spain.
2009 **Award of excellence in academic performance**, *Top 10 student of science and mathematics*, Murcia, Spain.

Publications

K.-H. Lee, G. Ros, J. Li, and A. Gaidon, "SPIGAN: Privileged adversarial learning from simulation," in *International Conference on Learning Representations*, 2019.

G. Villalonga, J. L. Gomez, G. Ros, A. M. Lopez, and D. Vazquez, "The SYNTHIA dataset reloaded," *Elsevier, Journal of Neurocomputing*, 2018.

M. R. Anderson, M. Cafarella, G. Ros, and T. F. Wenzsch, "Physical representation-based predicate optimization for a visual analytics database," *arXiv preprint abs/1806.04226*, 2018.

M. R. Anderson, M. Cafarella, G. Ros, and T. F. Wenzsch, "Predicate optimization for a visual analytics database," *SySML conference*, 2018.

R. Szeto, S. Stent, G. Ros, and J. J. Corso, "A dataset to evaluate the representations learned by video prediction models," in *International Conference on Learning Representations (ICLR) Workshops*, (Vancouver, Canada), 2017.

A. M. Lopez, G. Villalonga, L. Sellart, G. Ros, D. Vazquez, J. Xu, J. Marin, and A. Mozafari, "Training my car to see using virtual worlds," *Elsevier, Image and Vision Computing*, 2017.

P. F. Alcantarilla, S. Stent, G. Ros, R. Arroyo, and R. Gherardi, "Street-view change detection with deconvolutional networks," *Autonomous Robots (AURO)*, Springer, 2017.

A. Dosovitskiy, G. Ros, F. Codevilla, A. Lopez, and V. Koltun, "CARLA: An open urban driving simulator," in *Conference on Robot Learning (CORL)*, (Mountain View, CA, US), 2017.

V. Vaquero, G. Ros, F. Moreno-Noguer, A. M. Lopez, and A. Sanfeliu, "Joint Coarse-and-Fine reasoning for deep optical flow," in *The IEEE International Conference on Image Processing (ICIP)*, (Beijing, China), 2017.

- A. M. Lopez, J. Xu, J. L. Gomez, D. Vazquez, and G. Ros, *From Virtual to Real World Visual Perception using Domain Adaptation – The DPM as Example*. Springer, 2017.
- G. Ros, L. Sellart, G. Villalonga, E. Maidanik, F. Molero, M. Garcia, A. Cedeno, F. Perez, D. Ramirez, E. Escobar, J. L. Gomez, D. Vazquez, and A. M. Lopez, *Semantic Segmentation of Urban Scenes via Domain Adaptation of SYNTHIA*. Springer, 2017.
- P. Alcantarilla, S. Stent, G. Ros, R. Arroyo, and R. Gherardi, "Street-view change detection with deconvolutional networks," in *Robotics: Science and Systems (RSS), Michigan, USA*, June 2016.
- G. Ros, S. Stent, P. F. Alcantarilla, and T. Watanabe, "Training constrained deconvolutional networks for road scene semantic segmentation," *arXiv preprint abs/1604.01545*, 2016.
- G. Ros, L. Sellart, J. Materzynska, D. Vazquez, and A. Lopez, "The SYNTHIA dataset: A large collection of synthetic images for semantic segmentation of urban scenes," in *The IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, (Las Vegas, USA (short oral)), 2016.
- G. Ros, J. Guerrero, and J. Alvarez, "Motion estimation via robust decomposition with constrained rank," *IEEE Transactions on Intelligent Vehicles*, 2016.
- G. Ros, J. Guerrero, A. Sappa, D. Ponsa, and A. Lopez, "Fast and robust fixed-rank matrix recovery," *arXiv preprint (submitted to T-PAMI)*, "<http://arxiv.org/pdf/1503.03004v3.pdf>", 2015.
- G. Ros and J. Alvarez, "Unsupervised image transformation for outdoor semantic labelling," in *In Proc. IEEE Intelligent Vehicles Symposium*, (Seoul, Korea), 2015.
- A. Gonzalez, G. Villalonga, G. Ros, D. Vazquez, and A. Lopez, "3D-guided multiscale sliding window for pedestrian detection," in *In Proc. Iberian Conference on Pattern Recognition and Image Analysis*, (Santiago de Compostela, Spain), 2015.
- G. Ros, S. Ramos, M. Granados, A. H. Bakhtiary, D. Vazquez, and A. Lopez, "Vision-based offline-online paradigm for autonomous driving," in *In Proc. IEEE Winter Conference on Applications of Computer Vision (WACV)*, (Hawaii, USA), 2015.
- G. Ros, J. Guerrero, A. Sappa, D. Ponsa, and A. Lopez, "Fast and robust l1-averaging-based pose estimation for driving scenarios," in *In Proc. British Machine Vision Conference (BMVC)*, (Bristol, UK), 2013.
- G. Ros, J. Guerrero, A. Sappa, D. Ponsa, and A. Lopez, "VSLAM pose initialization via Lie-groups and Lie-algebras optimization," in *In Proc. IEEE International Conference on Robotics and Automation (ICRA)*, (Karlsruhe, Germany), 2013.
- G. Ros, J. M. del Rincon, and G. Garcia-Mateos, "Articulated particle filter for hand tracking," in *In Proc. International Conference on Pattern Recognition (ICPR)*, (Tsukuba Science City, Japan), 2012.
- G. Ros, A. Sappa, D. Ponsa, and A. Lopez, "Visual slam for driverless cars: A brief survey," in *In Proc. IEEE Workshop on Navigation, Perception, Accurate Positioning and Mapping for Intelligent Vehicles*, (Alcala de Henares, Spain), 2012.
- G. Ros and G. Garcia-Mateos, *Augmented Reality based on Natural Features*. AP LAMBERT Academic Publishing GmbH & Co, 1st edition ed., 2012.
- L. M. Vera, G. Ros, G. Garcia-Mateos, and F. J. Sanchez-Vazquez, "MS-222 toxicity in juvenile seabream correlates with diurnal activity, as measured by a novel video-tracking method," *Journal of Aquaculture, Elsevier*, 2010.
- G. Ros, G. Garcia-Mateos, L. M. Vera, and F. J. Sanchez-Vazquez, "A new taxonomy and graphical representation for visual fish analysis with a case study," in *In Proc. Workshop on Visual Observation and Analysis of Animal and Insect Behavior (VAIB), ICPR*, (Istanbul, Turkey), 2010.