German Ros

Principal Engineer & Director, Autonomous Agents Lab

About me

Passionate about transforming research results into impactful solutions. Big open source advocate. I spend a considerable amount of my time building large communities of users around my projects, e.g., CARLA and Open3D. I also work on creating new formulas to balance software openness and revenue, research and productization.

E-mail: germanros1987@gmail.com, **Web:** http://germanros.net.
Google scholar: https://scholar.google.es/citations?user=-qGCJfsAAAAJ
Citizenship: Born in Spain, 1987. US Green Card Holder.

Work Experience

2021–Present **Director, Autonomous Agents Lab**, *Intel*, Santa Clara, CA.
- Leading an international and distributed research lab (+10 headcounts) to pivot from blue skies research to applied research, focused on 3D AI, Simulation for AI, Digital Twins, Sim-to-Real.
- Leading research collaborations with academia and industry partners.
- Creating new corporate pipelines to accelerate the delivery of research results to products and services.
- Leading the creation of new products in the spaces of AI, 3D Content Creation, and Simulation platforms.
- Leading the R&D strategy for Digital Twins, Simulation for AI, and 3D Content Creation solutions.
- Active mentoring of researchers and engineers.

2021–Present **Principal Investigator, DARPA RACER-SIM**, *Intel*, Santa Clara, CA.
- Leading an international consortium (US, Spain) of +30 headcounts to create the next generation of simulation solutions for off-road ground robots.
- Leading the technical development of new real-time terramechanics simulation algorithms using machine learning.
- Leading the technical development of new Digital Twins solutions for large off-road environments.

2019–2020 **Program Lead, Advanced simulation solutions for AD**, *Intel-General Motors*, Santa Clara, CA.
- Led an international and distributed team to create new simulation solutions to help General Motors in the training and validation of autonomous driving systems.
- Created shared IP in the space of Simulation for Autonomous Systems and Digital Twins.

2018–2020 **Co-founder, OSVF.org: Open Source Vision Foundation**, *OSVF.org*, Palo Alto.
- Created a non-profit organization to drive the growth of open-source projects in the space of AI, Computer Vision, and Simulation.
- Raised +3M USD in funding over 2 years through sponsorships and contracts.
- Grew a team of +20 engineers to develop new solutions based on open-source projects (e.g., CARLA).

2018–2021 **Sr. Staff Scientist**, *Intel Labs*, Santa Clara, CA.
- Served as the program lead for 3D Vision, driving research and technology transfer of novel solutions in the space of 3D Scene Understanding and 3D Reconstruction.
- Served as the program lead for Simulation for Autonomous Systems, creating new solutions to accelerate and standardize the training and validation of autonomous systems. Helped 7+ industry partners to solve problems in the space of Autonomous Systems through simulation.
- Drove the creation of large communities around open-source projects such as CARLA (from 0 to +200K users) and Open3D (from 100 to +150K users). CARLA is now considered the top-1 autonomous driving simulator, widely used in academia, industry, and government institutions (e.g., DOT, DOE, DOD). Open3D was designated by the Python community as a critical project (top 1% project in downloads over 6 months).
- Developed new AI-powered techniques in the space of sensor simulation, physics simulation, and Sim-to-Real.

2017–2018 **Research Scientist**, *Toyota Research Institute*, Los Altos, CA.
- Carried out research in computer vision for Autonomous Driving and Sim-to-Real technologies.
- Created and led the sensor simulation team, providing new simulation tools for the evaluation of autonomous driving systems end-to-end.
- Served as the coordinator of research collaborations with University of Michigan.

2016 **R&D Contractor**, *Yandex*, Remote.
- Developed new algorithms for change detection using deep learning techniques and synthetic data.

Internships & Research Stays

2016 **Research Intern**, *Toshiba R&D Center: Interactive and Media Laboratory, Automotive division*, Kawasaki, Japan.
Novel Training methods for Deconvolutional Networks.

2015 **Research Intern**, *Toshiba Research Lab Cambridge*, Cambridge, UK.
Deep Semantic Segmentation for Driverless cars.

2013–2014 **Research Intern**, *NICTA, Canberra Research Lab*, Canberra, Australia.
Robust Decompositions for Outlier Detection in Urban Visual Odometry.

2013 **Research Visitor**, *Karlsruhe Institute of Technology: Institute of Measurement and Control Technology (MRT)*, Karlsruhe, Germany.
Robust Lie-Averaging for Fast pose Initialization.

Skills

Applied Research & Development, Tech. transference & Productization, Leadership, 3D Vision, Simulation for Autonomous Systems, Sim-to-Real, Machine Learning, Game engines, Rendering.

Education

2011–Sept 2016 **PhD in Computer Vision (Cum Laude, International Doctor)**, *Computer Vision Center – Universitat Autonoma de Barcelona*, Spain.

2011–2012 **MSc in Computer Vision and Artificial Intelligence**, *Universitat Autonoma 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., Cum Laude)**, *University of Murcia*, Spain, *1st class*.

Patents

2022 **Inferring locations of 3D objects in a spatial environment**.
2021 **System and method for system-aware classifiers**.
2020 **Adversarial learning of photorealistic post-processing of simulation with privileged information**.
2020 **Inferring locations of 3D objects in a spatial environment**.
2020 **System and method for generating improved synthetic images**.
2020 **Method and apparatus for a manifold view of space**.
2020 **Systems and methods for conditional image translation**.
2019 **System and method for full-stack verification of autonomous agents**.
2019 **Virtually boosted training**.
2018 **Training constrained deconvolutional networks for road scene semantic segmentation**.

Languages

Spanish Native
English Proficient user
Catalan Basic user
Japanese Basic user

Awards & Honours

2021 **National Research Award for Public-private Partnership in Research & Innovation**, *Barcelona, Spain*.

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. Wenisch, "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. Wenisch, "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) Worshops*, (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.