DIEGO PATIÑO

POST-DOCTORAL RESEARCHER

Geometric Computer Vision and Machine Learning

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SUMMARY

I am an experienced engineer looking to apply my passion, skills, and expertise in machine learning and computer vision to a new R&D role. I am passionate about conceiving, designing, and coding solutions to engineering problems at the intersection of computer vision, 3D reconstruction, and machine learning. I am eager to work to apply my skills and experience in a collaborative environment.
Throughout my career as a researcher and software developer, I have acquired extensive skills and experience leading and collaborating within and between interdisciplinary teams. I specialize in building models, data pipelines, and computational tools based on state-of-the-art computer vision and machine learning frameworks.

EDUCATION

2014 - 2020 **National University of Colombia - Medellin, Colombia**
Ph.D. in Computer Engineering
Advisor: **John W. Branch**
Dissertation: "Shape Analysis and Description Based on the Isometric Invariances of Topological Skeletonization."

2010 - 2012 **National University of Colombia - Medellin, Colombia**
M.Sc. in Computer Engineering
Advisor: **John W. Branch**
Thesis: "Automatic landform classification using texture analysis on satellite images."

2005 - 2010 **National University of Colombia - Medellin, Colombia**
B.S.E. in Computer Engineering

WORK EXPERIENCE

2020 - Present **Post-Doctoral Researcher**
University of Pennsylvania
GRASP Lab - General Robotics, Automation, Sensing & Perception Lab

- *Lead independent research on **machine learning and geometric computer vision**.*
- *Designed a novel graph **neural network-based control for Unmanned Aerial vehicles** navigating in turbulent wind fields.*
- *Developed physically-grounded novel deep learning-based methods for **3D reconstruction** from single-image or point clouds.*
- *Developed novel **geometry-based pose features** for imitation deficiency in subjects with **Autistic Spectrum Disorder (ASD)**, in collaboration with the Philadelphia's Children Hospital.*
- *Mentored and supervised research for multiple Ph.D. and Master students.*
- *Coordinated and secured guest speakers for weekly team meetings, to discuss the **latest state-of-the-art advances in computer vision**.*
- *Worked under the supervision of **Prof. Kostas Daniilidis**.*

2018 - 2020 **Visiting Researcher**
University of Pennsylvania
GRASP Lab - General Robotics, Automation, Sensing & Perception Lab

- *Conducted research on deep learning and geometric computer vision.*
- *Developed computer vision tools for **symmetry detection in 3D objects**.*
- *Worked under the supervision of **Prof. Kostas Daniilidis**.*

2016 - 2018 **Software Developer**
Gotta Ingenieria
https://gottaingenieria.com

- *Designed and developed several **python-based hydro-morphology simulation** plug-ins for the ArcGIS platform.*

2016 - 2016 **Software Developer**
Launchpad
https://www.launchpadapps.com.au

- *Designed and developed client/server apps for the iOS platform in **Objective C and Swift** programming languages.*

2014 - 2015 **Research Assistant**
University of Wisconsin-Madison
Laboratory for Molecular and Computational Genomics

- *Conducted research to develop new computer vision approaches for **detecting, sequencing, and aligning single DNA molecules under confinement**. I worked under the supervision of **Prof. David C. Schwartz**.*

2012 - 2014 **Software Engineer**
Early Warning System of the City of Medellín
https://siata.gov.co

- *Developed software to support **geo-spatial data visualization** for weather forecasting.*
- *Implemented **computer vision tools** to process images generated from Doppler microwave weather radars.*

2012 - 2012 **Research Assistant**
Pontifical Catholic University of Chile
Department of Computer Science

- *Created feature extraction, selection, and classification methods for **computer vision-based automatic quality inspection**. I worked under the supervision of **Prof. Domingo Mery**.*

2008 - 2011 **Research Assistant**
National University of Colombia
Department of Geo-science and Water Resources

- *Developed **computer vision tools** applied to geo-spatial information and automatic classification of landforms.*

SKILLS

Python/Numpy/SciPy/Matplotlib	11+ yrs	**Matlab**	4+ yrs
Pytorch/Tensorflow/Jax/OpenCV	5+ yrs	**Java**	3+ yrs
Git/CSV/SVN	10+ yrs	**C++/CUDA**	5+ yrs
Linux/Unix	18+ yrs	**Scientific writing/LaTeX**	14+ yrs
Slurm/Docker/Kubernets	4+ yrs		

LANGUAGES

- **Spanish** Native
- **English** Fluent
- **Portuguese** Good

HONORS AND AWARDS

- MinCiencias Doctoral Scholarship, Colombia, 2015.

- Enlazamundos Scholarship, Medellín - Colombia, 2012.
- Full Tuition Fellowship Award (Masters program), Faculty of Mines, National University of Colombia, 2012.

REVIEWER

Journals

- **IEEE Transactions on Medical Imaging.**
- **Elsevier's Pattern Recognition Journal.**
- **Canadian Journal of Forest Research.**
- **Revista DYNA.** Engineering journal edited by the National University of Colombia.

Conferences

- **ICPR'22 Reviewer.** 26th International Conference on Pattern Recognition.
- **MICCAI'23.** 26th International Conference on Medical Image Computing and Computer-Assisted Intervention.
- **MICCAI'22.** 25th International Conference on Medical Image Computing and Computer-Assisted Intervention.
- **MICCAI'21.** 24th International Conference on Medical Image Computing and Computer-Assisted Intervention.

PUBLICATIONS

2023 **Patiño, D., Mayya, S., Calderon, J., Daniilidis, K., and Saldaña, D.**, "Learning to Compensate Wind Turbulence with a Team of Robots: A Reinforcement Learning Approach", Robotics and Automation Letters .

2022 **Patiño, D., Schmeckpeper, K., Gupta, H., Georgakis, G., and Daniilidis, K.**, "Self-supervised implicit shape reconstruction and pose estimation for video prediction", ICRA Workshop on Motion Planning with Implicit Neural Representations of Geometry - 2022 .

2022 **Patiño, D., Esteves, C., and Daniilidis, K.**, "Level Set Mesher: Single-image to 3D reconstruction by following the level sets of the signed distance function", ICPR 2022 .

2021 **Patiño, D., and Branch, J.W.**, "Cosine-Pruned Medial Axis: A New Method for Isometric Equivariant and Noise-Free Medial Axis Extraction", IEEE Access , https://doi.org/10.1109/ACCESS.2021.3072933.

2020 **Patiño, D., Ceballos-Arroyo, A. M., Rodriguez-Rodriguez, J. A., Sanchez-Torres, G., and Branch-Bedoya, J. W.**, "Melanoma detection on dermoscopic images using superpixels segmentation and shape-based features", 15th International Symposium on Medical Information Processing and Analysis , https://doi.org/10.1117/12.2545300.

2018 **Patiño, D., Avendaño, J., and Branch, J.W.**, "Automatic skin lesion segmentation on dermoscopic images by the means of superpixel merging", International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI) , https://doi.org/10.1007/978-3-030-00937-3_83.

2018 **Goez-Mora, J. E., Londoño-Lopera, J. C., and Patiño, D.**, "Automatic Visual Classification of Parking Lot Spaces: A Comparison Between BoF and CNN Approaches", Workshop on Engineering Applications , https://link.springer.com/chapter/10.1007/978-3-030-00350-0_14.

2017 **de León, J.C.B., Patiño, D., Restrepo, A., and Branch, J.W.**, "Computational Detection of Salient Information to Identify High Stress and Ambiguity Regions in Digital Photoelasticity Images", Image Processing and Applications (IM4E) , https://doi.org/10.1364/ISA.2017.IM4E.2.

2015 **Zhou, S., Goldstein, S., Place, M., Bechner, M., Patiño, D., Potamousis, K., Ravindran, P., Pape, L., Rincon, G., Hernandez-Ortiz, J., Medrano, J. F. and Schwartz, D. C.**, "A clone-free, single molecule map of the domestic cow (Bos taurus) genome", BMC Genomics , https://doi.org/10.1186/s12864-015-1823-7.

2012 **Patiño, D., Mery, D., Fernandez, B.V., Branch, J.W.**, "Automatic Landform Classification of Uplands Based on Haralick's Texture", CLEI XXXVIII - Latin-American Informatics Conference, IEEE , DOI:10.1109/CLEI.2012.6427164.