

Prune Truong

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My main research interests are machine learning, deep learning and statistical models for computer vision applications, particularly for the task of image matching, pose estimation and 3D reconstruction.

Education and Degrees

May 2020 – Oct. 2023* **Doctor of Philosophy in Computer Vision**, *Computer Vision Lab, Swiss Federal Institute of Technology of Zurich (ETH Zurich), Switzerland.*

- PhD studies with Prof. Luc Van Gool and Dr. Martin Danelljan as my advisors.
- In the first part of my PhD, I worked on novel deep learning architectures and training strategies for estimating dense correspondences between image pairs.
- I am currently interested in 3D reconstruction, pose estimation and novel-view rendering.

2017 – 2020 **Master of Science in Mechanical Engineering**, *ETH Zurich*, average grade 5.83/6.

- I graduated with Honors.
- I took diverse courses, such as computer vision, machine learning, control system and design-thinking.
- My master's thesis titled *Dense correspondence search* was presented at the premier conference on Computer Vision and Pattern Recognition (CVPR) 2020 as an oral.

2014 – 2017 **Bachelor of Science in Material Engineering**, *Swiss Federal Institute of Technology of Lausanne (EPFL), Switzerland*, average grade 5.49/6.

- The first two years mostly focused on mathematics and physics.
- The final year included courses about the analysis and classification of materials, modeling techniques and programming.

2016 – 2017 **Exchange year**, *Nanyang Technological University, Singapore*, average grade 4.90/5.

- Competitive exchange program for top third year student of EPFL, with average grade above 5/6.

Work Experience and Academic Positions

Feb. 2023 – May 2023 **Research Intern**, *Google Semantic Perception, Switzerland.*

- I worked on designing joint pose-NeRF refinement strategies to make them available for real applications.
- I developed an approach to generate high-quality light-weight meshes from pre-trained NeRFs to enable fast rendering in interactive online set-ups.

July 2022 – Dec. 2022 **Research Intern**, *Google Semantic Perception, Switzerland.*

- I worked in Federico Tombari's team on the problem of NeRF from sparse views and noisy poses.
- I developed SPARF, the first joint pose-NeRF training strategy capable of producing realistic renderings given as few as 2 or 3 input images with noisy poses.
- The work was published at the conference of Computer Vision and Pattern Recognition (CVPR) 2023, with a highlight mention.

April 2022 – June 2022 **Research Intern**, *Microsoft Mixed Reality and AI Lab, Switzerland.*

- I worked in Marc Pollefeys's team on visual localization.
- I developed a model and training strategy for direct matching of a point cloud and an image, for which a patent application is currently pending.

May 2020 – present **PhD Student in Computer Vision**, *Computer Vision Lab, ETH Zurich.*

The position includes research, studying related graduate courses and teaching. It also involves supervising master students during their thesis.

- Sept. 2018 – **Deep Learning Research Intern**, *Start-up RetinAI, Switzerland*.
- Feb. 2019
- I designed and implemented a training procedure to detect keypoints - GLAMPpoints - in low quality and texture-less medical images.
 - The algorithm was successfully integrated in a product and sold to a major pharmaceutical company.
 - It resulted in my first research publication at the International Conference on Computer Vision (ICCV) 2019. It also led to a US Patent (N°17438944).
- June 2017 – **Molecular Dynamics Research Summer Intern**, *Paul Scherrer Institute, Switzerland*.
- Aug. 2017
- I independently learnt in 8 weeks from scratch to an advanced level LAMMPS and AtomsK (Software and coding language), Ovito (analysis tool) and to use the Swiss Supercomputer center (CSCS).
 - I modeled and analysed the influence of different metals and interatomic potentials on the dislocation-twin boundary interactions in 3D.

Entrepreneurial Experience

- 2018 **DIVE workshop**, *McKinsey & Company, Vienna, Austria*.
- DIVE is a 3-day workshop where selected participants work on a mock McKinsey case.
 - I was one of the 20 participants selected, among more than 200 applicants.
 - I conducted a consulting case study, whose conclusions were presented to McKinsey consultants.
- 2018 **Easy Travel Assistant App**, *Clinton Global Initiative (CGI) University, Chicago, USA*.
- As a personal project, I created an app, Easy Travel Assistant, to make it easier and safer for visually impaired people to commute using public transport on their own.
 - I was invited by the CGI University network to present my project to their annual meeting of the next generation of leaders around the world, in the area of public health.





Publications

- CVPR 2023 **SPARF: Neural Radiance Fields from Sparse and Noisy Poses.**
Highlight. Prune Truong, Marie-Julie Rakotosaona, Fabian Manhardt, Federico Tombari.
 top **2.5%** IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2023.
- WACV 2023 **Refign: Align and refine for adaptation of semantic segmentation to adverse conditions.**
 David Brüggemann, Christos Sakaridis, Prune Truong, Luc Van Gool.
 IEEE Winter Conference on Applications of Computer Vision (WACV), 2023.
- TPAMI 2023 **PDC-Net+: Enhanced Probabilistic Dense Correspondence Network.**
 Prune Truong, Martin Danelljan, Radu Timofte, Luc Van Gool.
 IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2023.
- CVPR 2022 **Probabilistic Warp Consistency for Weakly-Supervised Semantic Correspondences.**
 Prune Truong, Martin Danelljan, Fisher Yu, Luc Van Gool.
 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2022.
- ICCV 2021 **Warp Consistency for Unsupervised Learning of Dense Correspondences.**
Oral, top 3.0% Prune Truong, Martin Danelljan, Fisher Yu, Luc Van Gool.
 IEEE International Conference on Computer Vision (ICCV), 2021.
- CVPR 2021 **Learning Accurate Dense Correspondences and When to Trust Them.**
Oral, top 4.0% Prune Truong, Martin Danelljan, Luc Van Gool, Radu Timofte.
 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021.
- NeurIPS 2020 **GOCor: Bringing Globally Optimized Correspondence Volumes into Your Neural Network.**
 Prune Truong, Martin Danelljan, Luc Van Gool, Radu Timofte.
 Conference on Neural Information Processing Systems (NeurIPS), 2020.
- CVPR 2020 **GLU-Net: Global-Local Universal Network for Dense Flow and Correspondences.**
Oral, top 5.7% Prune Truong, Martin Danelljan, Radu Timofte.
 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020.
- ICCV 2019 **GLAMPoints: Greedily Learned Accurate Match points.**
 Prune Truong, Stefanos Apostolopoulos, Agata Mosinska, Samuel Stucky, Carlos Ciller, Sandro De Zanet.
 IEEE International Conference on Computer Vision (ICCV), 2019.

Awards

- 2022 Recipient of an **Apple AI/ML PhD Fellowship**. There were only 15 recipients world-wide.

Open Source Projects

- ☆ 89 **SPARF**  <https://github.com/google-research/sparf>
- ☆ 470 **DenseMatching**  <https://github.com/PruneTruong/DenseMatching>
A general deep learning framework for evaluating and training dense matching networks, based on PyTorch.
- ☆ 71 **GOCor**  <https://github.com/PruneTruong/GOCor>
- ☆ 207 **GLU-Net**  <https://github.com/PruneTruong/GLU-Net>

Teaching

- 2021 **Image Analysis and Computer Vision**, *ETH Zurich*, Teaching assistant.
Teaching assistant for theoretical and programming exercises, along with correcting exams.

Invited Speaker and Talks

- 2023 **Dense Matching and Its Applications**, *Invited talk for the Swedish WASP program*, Zurich.
- 2022 **Dense Matching**, *Invited talk at Google, Semantic Perception*, Zurich.
- 2022 **Dense Matching**, *Invited talk at Microsoft, Mixed Reality and AI Lab*, Zurich.
- 2021 **PDC-Net and matching challenge**, *Image Matching Workshop: Local Features & Beyond*, CVPR 2021, Virtual.
- 2021 **PDC-Net (CVPR 2021)**, *Reading group of Dr. Krystian Mikolajczyk at Matchlab*, Virtual.
- 2021 **GOCor (NeurIPS 2020)**, *Computer Vision Talks*, Virtual.

Personal and Technical Skills

- Languages French (native), English (fluent), Spanish (intermediate)
- Programming Python, LaTeX, MATLAB, C++ and C (basic knowledge)
- Deep learning PyTorch, Tensorflow, JAX (basic knowledge)