








# Clément Pinard

## PhD

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**Research Interests** I am particularly interested in Computer Vision, Deep Learning and 3D Geometry. The past focus of my research was training a neural network to generate a depth map from a monocular aerial footage, with a focus on robustness. This work has been supervised by both ENSTA Paris and Parrot Drones, and is aimed at obstacle avoidance for consumer UAVs. More recently, I worked on trying to improve neural networks with geometric algebra at the company Upstride. I am currently working at XXII, which aims at applying computer for security cameras. In particular, I am working on evaluation of objects detection and tracking algorithms and on 3D objects localization

**Publications** **Does it work outside this benchmark? Introducing the Rigid Depth Constructor tool, depth validation dataset construction in rigid scenes for the masses.**  
[https://clementpinard.fr/rigid\\_depth\\_constructor](https://clementpinard.fr/rigid_depth_constructor)

We present a framework to create depth-enabled images with a Lidar scanner. The tool aims at being the most flexible and user friendly possible

**Robust Learning of a depth map for obstacle avoidance with a monocular stabilized flying camera**  
[https://clementpinard.fr/phd\\_thesis](https://clementpinard.fr/phd_thesis)

Original title *Apprentissage robuste d'une carte de profondeur pour l'évitement d'obstacle dans le cas des caméras volantes, monoculaires et stabilisées*. PhD defended in june 2019

**Learning structure-from-motion *from motion***  
Clément Pinard, Laure Chevalley, Antoine Manzanera and David Filliat  
**GMDL Workshop @ ECCV2018**  
[https://clementpinard.fr/unsupervised\\_depthnet/](https://clementpinard.fr/unsupervised_depthnet/)

This work questions the quality metrics used by deep neural networks performing depth prediction from a single image, and the usability of published works on unsupervised learning of depth from videos. In contrast, we propose to learn in the same unsupervised manner a variation of DepthNet, presented in our previous work, which is more suited for robustness.

**End-to-end depth from motion with stabilized monocular videos**  
Clément Pinard, Laure Chevalley, Antoine Manzanera and David Filliat  
**UAV-g 2017 (Oral)**

<https://clementpinard.fr/depthnet>

<https://stillbox.ensta.fr>

We present DepthNet, a fully convolutional neural network. This is a depth map inference system from monocular stabilized videos based on a novel dataset for navigation that mimics drone footage

**Multi range Real-time depth inference from a monocular stabilized footage using a Fully Convolutional Neural Network**

Clément Pinard, Laure Chevalley, Antoine Manzanera and David Filliat

**ECMR 2017 (Poster Session)**

<https://hal.archives-ouvertes.fr/hal-01587658>

Inspired from HDR imaging, we propose a multi-range architecture for unconstrained UAV flight, leveraging flight data from sensors to make accurate depth maps for arbitrary long range.

The last two publications resulted in a patent filing by Parrot Drones in 2017

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## Education



CentraleSupélec

**ENSTA Paris** (Palaiseau, France)

**Ph.D.**, Computer Vision, (2016 – 2019 )

supervised by Antoine Manzanera

Robust Learning of a depth map for obstacle avoidance with a monocular stabilized flying camera

**Centrale-Supelec** (Gif sur Yvette, France)

**MEng** (2011 – 2015)

Student in a leading Engineering School in the fields of electrical energy and information sciences

Speciality in Electronic Systems, Networks & Images



**Collège Stanislas** (Paris, France)

*Classe préparatoire aux Grandes Ecoles - MP\** (2009 – 2011)

**Lycée Alain Fournier** (Bourges, France)

*Classe préparatoire aux Grandes Ecoles - MPSI* (2008 – 2009)

## Work Experience



**XXII** (Puteaux – La Défense, France)  
Computer Vision Scientist (2022 – present)  
Computer Vision solutions for security cameras, especially object detection and tracking



**Contentsquare** (Paris, France)  
Data Scientist (2021 – 2022)  
Web page contextualization for automatic page and html elements classification



**Upstride** (Paris, France)  
Research scientist (2021)  
Applying Geometric Algebra on convolutional neural networks for semantic segmentation



**ENSTA Paris** (Palaiseau, France)  
Research Engineer, (2019 – 2020)  
Constructing a dataset for depth map evaluation in the context of obstacle avoidance for a monocular stabilized flying camera

**Parrot Drones** (Paris, France)  
Phd Student (with ENSTA Paris) (2016 – 2019)

## Parrot

Computer Vision Intern (2015)  
Designing and implementing an algorithm for vision-based localization with a known target for embedded system



**Technip** (Kuala Lumpur, Malaysia)  
Knowledge management intern (2014)  
Designing and administrating a knowledge management platform tool for project managers, from tender to product shipping



**Civolution, now part of Kudelski Group** (Rennes, France)  
Software Engineering Intern (2013 – 2014)  
Modifying *x264* encoder to include Nexguard Watermarking plugin within the encoding process

Languages French (native), English (fluent)

Skills and technologies Python, C/C++, CUDA, Lua  
PyTorch, Torch, Numpy, OpenCV, PCL

References **Antoine Manzanera** - PhD advisor

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**David Filliat** - Phd advisor and Head of U2IS lab

david.filliat@ensta-paris.fr

**Laure Chevalley** - Former Head of Flight Vision team at Parrot Drones

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