

# From geometric learning to 3D visual intelligence

Bingchen Gong · 26 October 2026

## Bingchen Gong

LIX, École Polytechnique  
Working with Maks Ovsjanikov

- Geometric learning for **3D understanding and generation**
- Connect geometric structure with **video, motion and animation**
- Build an independent research programme within the **MM team**



ZeroKey · ICCV 2025

Locate a semantic point in a 3D shape

“Point to the nose”

ZeroKey · ICCV 2025, Fig. 1 · Original predicted keypoints

# Consistent and controllable 3D content

Research vision

Proposed direction

How can geometric structure help models  
**understand and generate dynamic 3D content?**

Images / video



Structured 3D representations



Reconstruction / animation

## Geometry

Preserve spatial structure

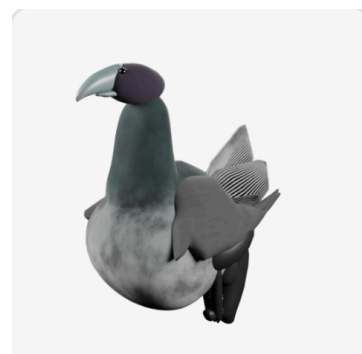


Target

3DHarnessBench · static 3D-to-code evidence

## Time

Stay consistent across frames



Executed result

## Control

Guide content with visual  
and semantic inputs

## A focused first test

Preserve named parts and geometric  
constraints through a simple edit.

Then test one articulated operation,  
if the static results justify it.

# A focused start, then a sustainable research programme

Research plan

Indicative plan

First six months

## Establish the foundation

- Reproduce a static baseline
- Define quality, constraint and compute tests
- Choose one extension with complementary MM expertise

Following phase

## Build the first student project

- Turn the initial problem into a coherent thesis topic
- Recruit with confirmed funding and supervision arrangements
- Connect focused internships to the same research question

Years two to three

## Extend what works

- Develop motion and animation from validated static results
- Build collaborations and competitive funding proposals
- Share methods, assets and evaluation tools

Indicative plan, to align with funding, teaching and recruitment arrangements.

Proposed programme · baseline → bounded extension → student project → broader research

# Connecting geometry, vision and deep learning in teaching

Teaching and integration

## What I can contribute

MVA M2 teaching assistantship

Geometry Processing and

Geometric Deep Learning · autumn 2026

- Geometric learning and computer vision
- Deep learning and student projects
- Experience in tutorials, labs and research mentoring

## How students learn

### 1. Understand an idea

Predict what should happen

### 2. Implement a baseline

Make the prediction testable

### 3. Evaluate its limitations

Explain failures with evidence

Example lab: remove input views from a 3D reconstruction and explain what fails.

**Develop contributions with course leaders and the existing curriculum.**

MVA assistantship · HKU teaching record and CTLHE · proposed reconstruction lab

# Building the first years at Télécom Paris

Discussion

1. What would successful progress look like in my first two to three years?
2. Where could my contribution be most useful across research and teaching?
3. What are the next steps towards the proposed **1 January 2027** start?

Discussion with Patrick Olivier · 26 October 2026