

From geometric learning to 3D visual intelligence

Bingchen Gong · Discussion with Patrick Olivier · 26 October 2026

5 slides for a short introduction followed by discussion.

Planned main talk: 6:15. Target: 7:00. 0:45 within the target.

Timings are rehearsal targets. Leave the remaining meeting time for discussion.

1. From geometric learning to 3D visual intelligence

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Planned duration 0:55 · 0:00–0:55 elapsed

Before presenting, ask: “I prepared a few slides to briefly introduce the direction I would like to develop. Would it be useful to go through them?”

My current work at École Polytechnique is with Maks Ovsjanikov. My research is in geometric learning, with a focus on 3D understanding and generation. This example is from ZeroKey: the model interprets a semantic query and locates a point on a three-dimensional shape. The brown point here is the nose of the airplane.

What attracts me to Télécom Paris is the opportunity to bring this geometric perspective to video, motion and animation. I would like to build an independent research programme within the MM team, while developing close collaborations with colleagues. The connection is to make 3D representations useful for understanding and controlling content.

2. Consistent and controllable 3D content

Research vision · Proposed direction

Planned duration 1:40 · 0:55–2:35 elapsed

The common question is how geometric structure can help models understand and generate dynamic 3D content. Geometry provides explicit spatial relationships. Time adds consistency across views and frames. Control means that a visual or semantic instruction should lead to a meaningful change in the content.

I would start from a concrete foundation in our current work. In 3DHarnessBench, an agent writes a Blender program, executes it, and inspects the resulting geometry. The left image is the target; the right is the executed reconstruction. The original target program is withheld. This is static reconstruction evidence, not yet evidence of reliable editing or animation.

My first question would be whether a structured representation can preserve named parts and geometric constraints through a simple edit. I would start with known geometry, so that reconstruction errors do not obscure whether the operation itself works. We would check the intended change, preservation of the rest of the shape, and cost.

If those tests are convincing, I would extend to one articulated operation, such as opening a drawer within its allowed range without collisions. Video observations and uncertain reconstructed geometry would come later. This gives the broader programme a bounded first step, with room to develop it alongside the team's expertise.

3. A focused start, then a sustainable research programme

Research plan · Indicative plan

Planned duration 1:35 · 2:35–4:10 elapsed

My priority would be to begin with a problem that is focused enough to make progress and substantial enough to grow into a student project. During the first six months, I would reproduce the static baseline, settle the task and evaluation, and establish the practical compute requirements. I would choose one extension with colleagues whose expertise complements mine.

The next phase would turn that problem into a coherent thesis topic. Recruitment would depend on the confirmed budget and supervision arrangements. A focused internship could help establish the experimental setup and connect students to the longer project, without making the thesis depend on several unrelated directions.

In years two and three, I would build on the strongest early results. The step toward motion and animation should follow evidence that the static representation and checks work. I would also develop collaborations and external funding proposals, while sharing useful evaluation tools and assets with the team.

Enzo has indicated that the position includes research and recruitment support; the exact allocation still needs to be clarified. I would plan the first project around the agreed resources. A future competitive fellowship would be an additional opportunity, rather than an assumption behind the initial programme.

4. Connecting geometry, vision and deep learning in teaching

Teaching and integration

Planned duration 1:20 · 4:10–5:30 elapsed

The MVA teaching assistantship in Geometry Processing and Geometric Deep Learning gives me a concrete starting point. Before that, I was a teaching assistant across eight courses at HKU, including fundamentals, graphics and AI. I would be interested in contributing to geometry, computer vision, deep learning and student projects, according to the school's needs.

My teaching approach is to connect an idea to an implementation and then to a critical evaluation. For example, in a reconstruction lab, students could first predict what happens when we remove input views. They would run a baseline, compare the outputs, and explain the failures in terms of coverage and geometry. The final task is to explain the result, as well as produce it.

Initially, I would learn how the existing curriculum is organised and coordinate with course leaders. I would build my contribution progressively, taking preparation time into account. I also intend to improve my French, using the language support available at the school.

5. Building the first years at Télécom Paris

Discussion

Planned duration 0:45 · 5:30–6:15 elapsed

These are the directions I would like to develop, and I would be very interested in your perspective. What would you consider successful progress in my first two to three years? Where do you see the best opportunities for me to contribute across research and teaching?

The proposed first of January start fits with my current contract ending in December. I would also appreciate understanding the remaining steps towards joining Télécom Paris.

Stop presenting and invite discussion.

Before the meeting ends, ask verbally: “Could you also clarify the initial contract type and duration, and the timeline and assessment criteria for a permanent appointment?” If the details sit with HR, ask who can confirm them and when. Enzo's account of his own appointment does not establish the terms of this one.