



# Dynamic Realms: 4D Content Analysis, Recovery and Generation with Geometric , Topological and Physical Priors



Homepage



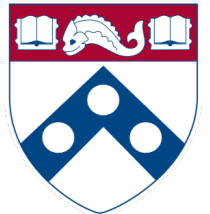
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Research Summary

Zhiyang (Frank) Dou

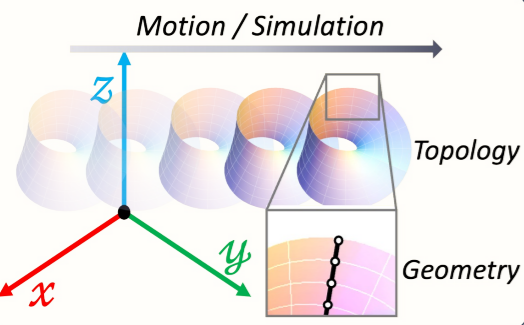
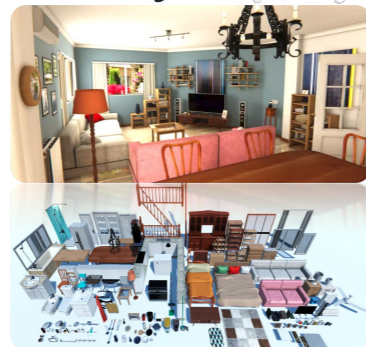
The University of Hong Kong (2020 - 2025)  
University of Pennsylvania (2023 - 2025)



## Research Summary

My research focuses on the analysis, recovery, and generation of 4D content, where 4D includes three spatial dimensions ( $x, y, z$ ) and a temporal dimension  $t$ , such as shape and motion. My research aims to make **4D content generation more efficient, accessible, and higher in quality** by incorporating *geometric, topological, and physical priors*. I also aim to develop effective methods for **4D content recovery and analysis** using these priors.

Character Animation; Simulation    Geometric Computing    4D Content Generation    Human Behavior Analysis



- ❖ Scene-level Physics-aware Shape Generation and Motion Synthesis.
- ❖ Enhancing the Integration of Priors in Complex 4D Dynamics Modelling.
- ❖ 4D Content Generation for Robot Learning (Real2Sim; Sim2Real2Sim) and Fabrication.

## Research Work

### 4D content generation

Crowd Simulation, SIGA24.

Phys. Animation.

Phys. Animation, SIGA23.

HMR., ICCV23.

Hand Face Recon.

Shape Gen., ECCV24.

### Character Animation & Motion Physics Simulation

Character Animation & Motion Physics Simulation

### 3D Shape Generation Reconstruction

3D Shape Generation Reconstruction

### Shape Modeling & Analysis

CAD Recon., SIG22.

Coverage Axis, EG22.

Coverage Axis++, SGP24.

Shape Abs., TVCG20.

### Geometric Computing

PC Orientation., SIG23.

### Human Behavior Analysis

HBA., PNAS Nexus23.

HBA., JHM22.

HBA., SCS23.

HBA., JHM23.

HBA., STOTEN2024.

### Human Behavior Analysis

Human Behavior Analysis