

# EndoPBR: Photorealistic Endoscopic Surgery Simulation

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## ADDRESSED NEED

Current synthetic image generation methods lack photorealism and 3D consistency required for training effective surgical AI systems. This technology directly addresses these challenges by providing realistic endoscopic data generation through advanced rendering.

EndoPBR generates photorealistic images at arbitrary camera poses for surgical scenes. The method produces novel view results compared to existing approaches and demonstrates superior photorealism over current mesh stylization techniques used in medical simulation.

## KEY BENEFITS

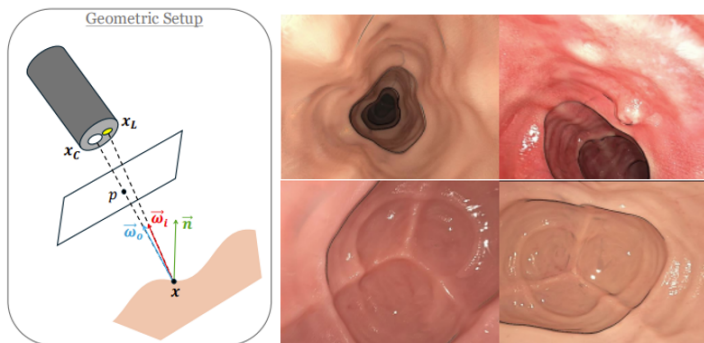
- **Unlimited synthetic training data** without patient privacy concerns
- **Superior photorealism** compared to existing surgical simulation methods
- **Cost-effective alternative** to expensive medical data collection
- **Proven performance** on standard colonoscopy datasets

## TECHNOLOGY FEATURES

- **Physically-based rendering** engine for realistic lighting simulation
- **Neural network integration** for enhanced material estimation
- **Multi-view synthesis** capability for arbitrary camera positions
- **Scalable pipeline** compatible with existing medical imaging workflows

## SUMMARY

EndoPBR generates **photorealistic surgical simulation data** using advanced neural rendering and physically-based lighting models. This technology enables **synthetic dataset creation** for training 3D vision algorithms in medical applications, particularly endoscopic procedures. Medical device companies and surgical robotics developers benefit from **unlimited training data** without concerns of patient privacy or expensive data collection.



*EndoPBR pipeline generating photorealistic endoscopic views with accurate material properties and lighting for surgical training applications.*

## OTHER DETAILS

### Intellectual Property Status:

Software in development

### Stage of Development:

Proof-of-concept validated on Colonoscopy 3D Video Dataset.

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