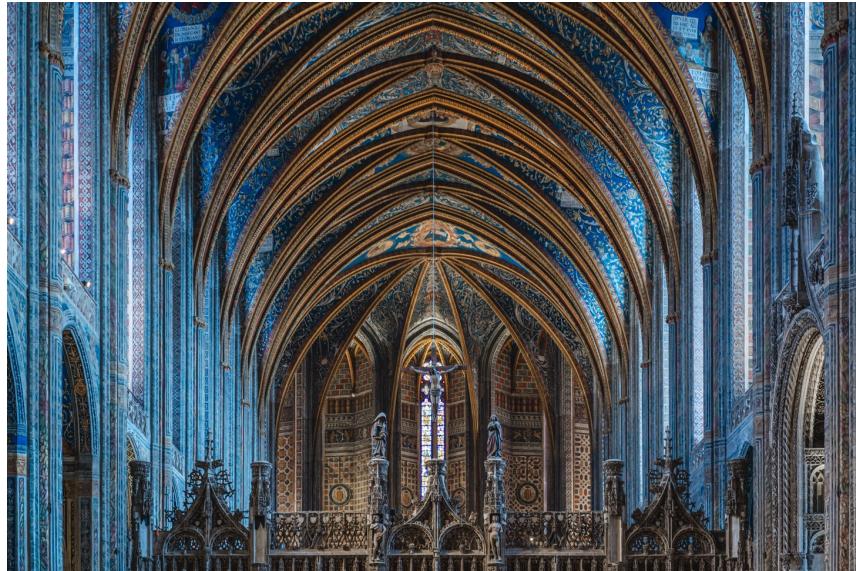
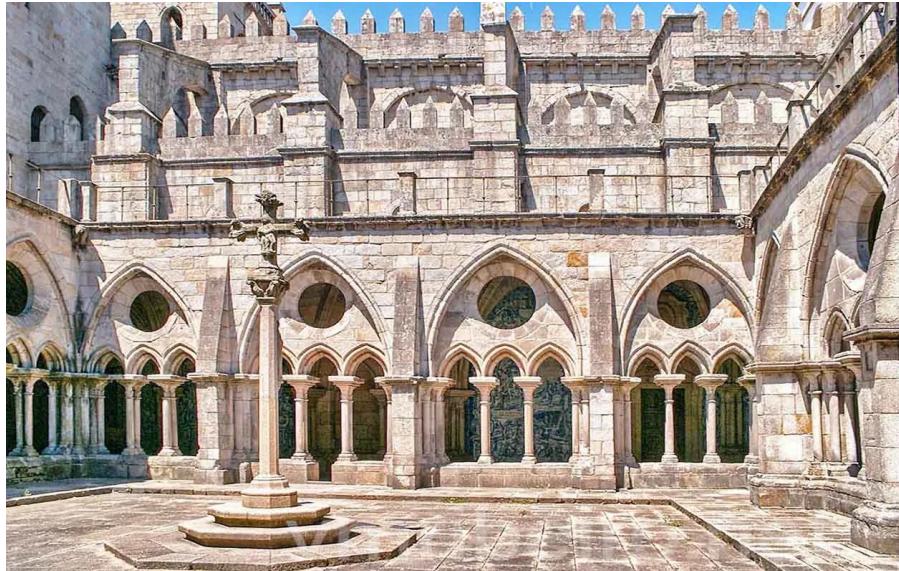


# Computational Modeling of Gothic Microarchitecture

Aviv Segall, Jing Ren, Martin Schwarz,  
Olga Sorkine-Hornung

# What is Gothic Microarchitecture?

Like Gothic Architecture...



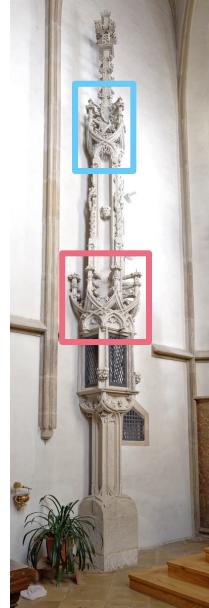
# What is Gothic Microarchitecture?

Like Gothic Architecture... but smaller

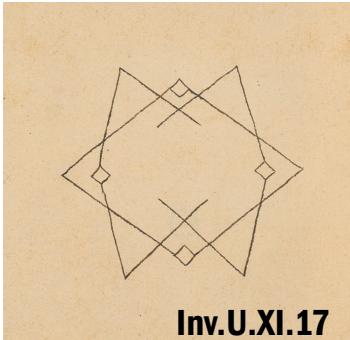


# What is Gothic Microarchitecture?

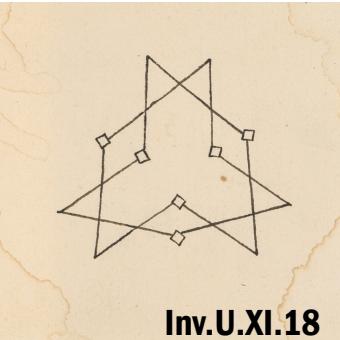
Like Gothic Architecture... but smaller



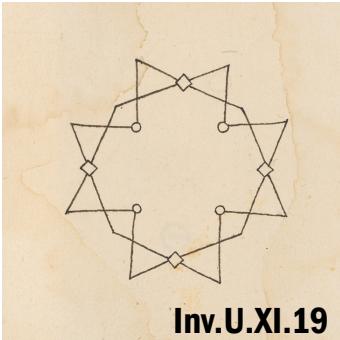
# Basel Goldsmith Drawings



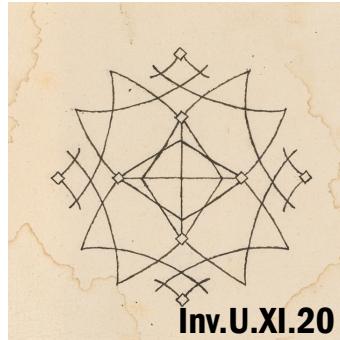
Inv.U.XI.17



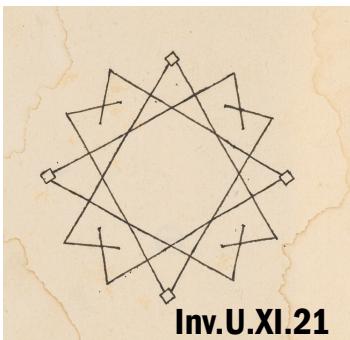
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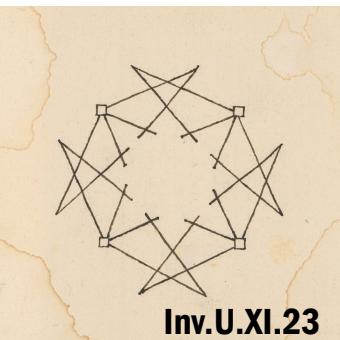
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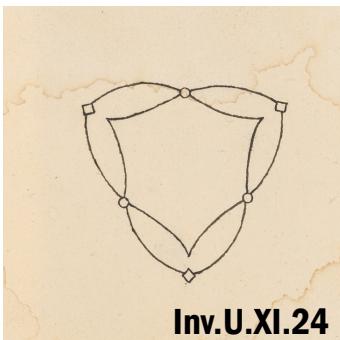
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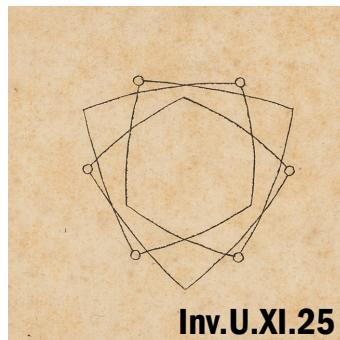
Inv.U.XI.21



Inv.U.XI.23



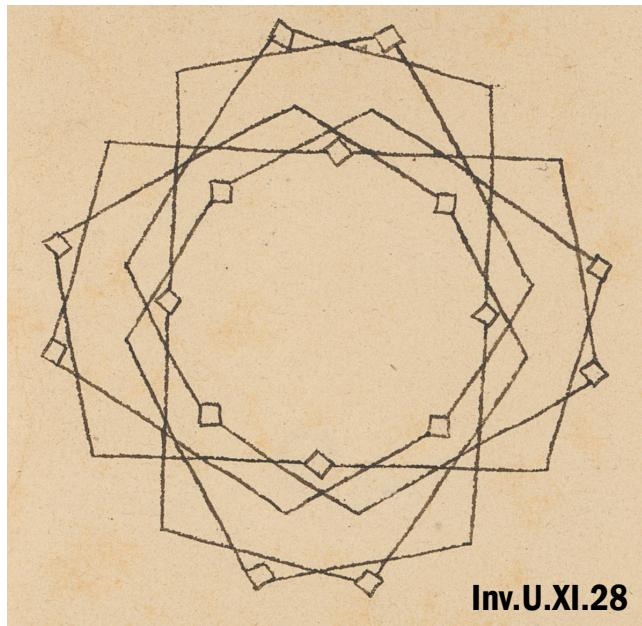
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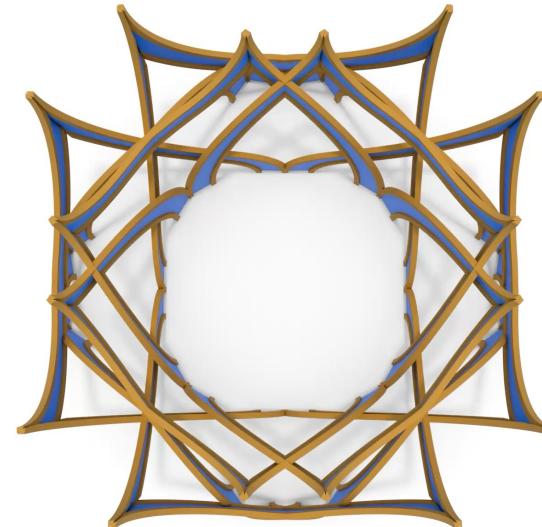
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# Gothic Microarchitecture Modeling

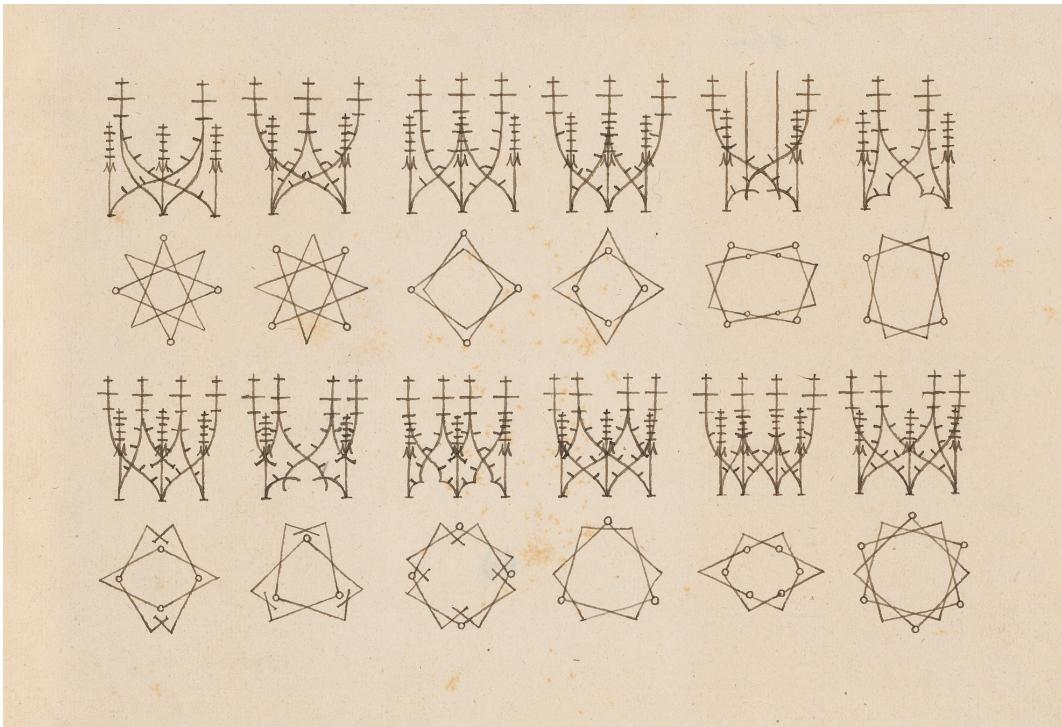
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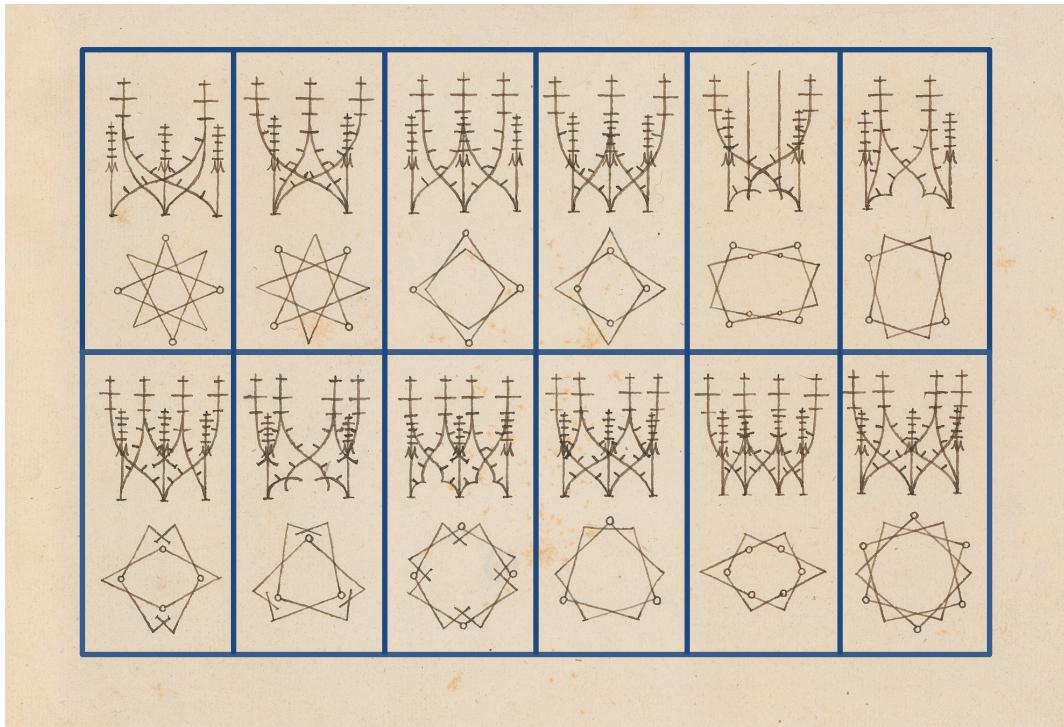
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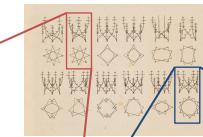
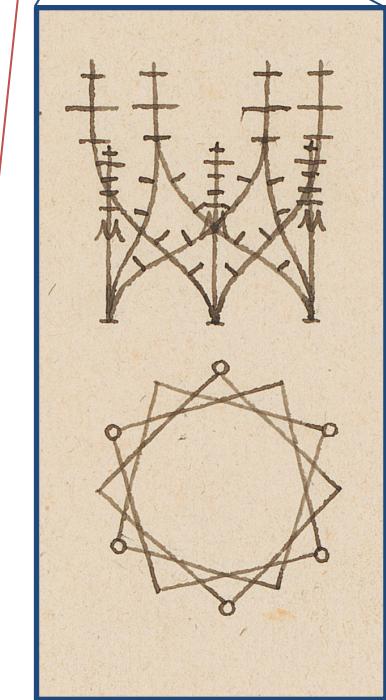
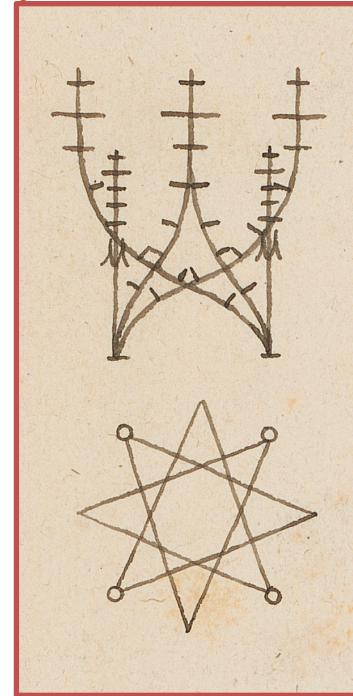
# Teaching Sheet



# Teaching Sheet

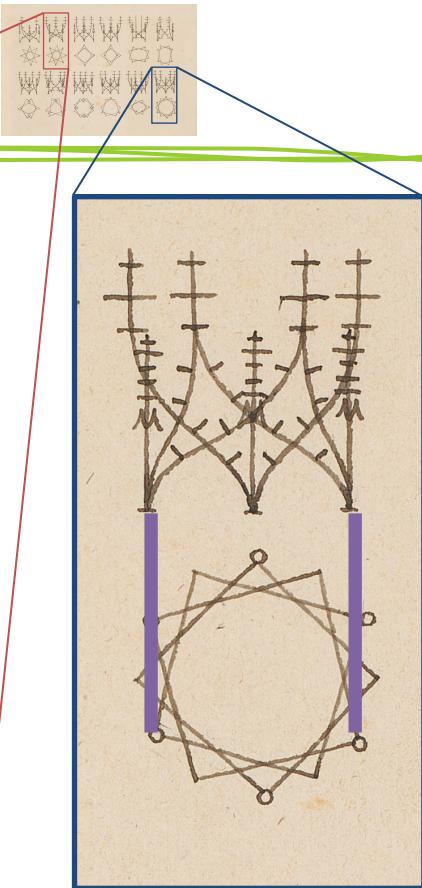
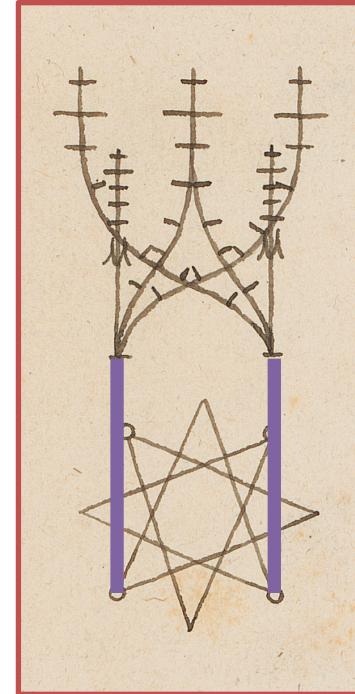


# Teaching Sheet



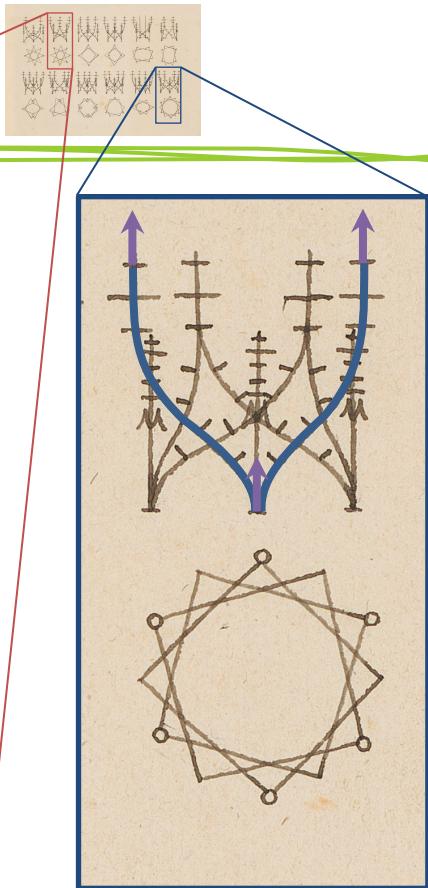
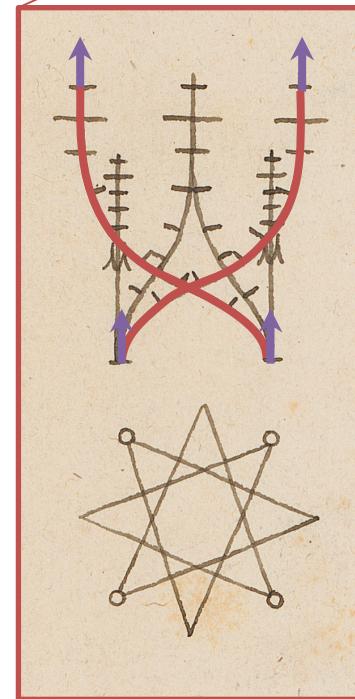
# Teaching Sheet

- Marked vertices are ground points



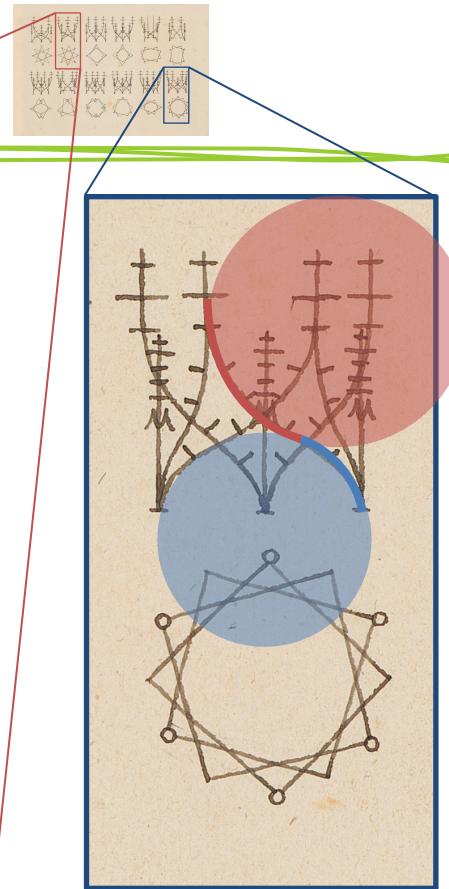
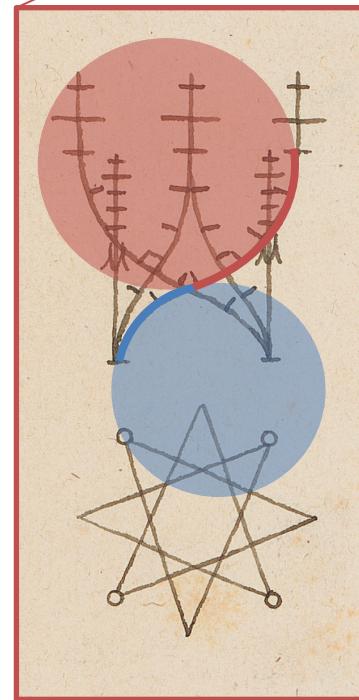
# Teaching Sheet

- Marked vertices are ground points
- Endpoints have vertical tangents



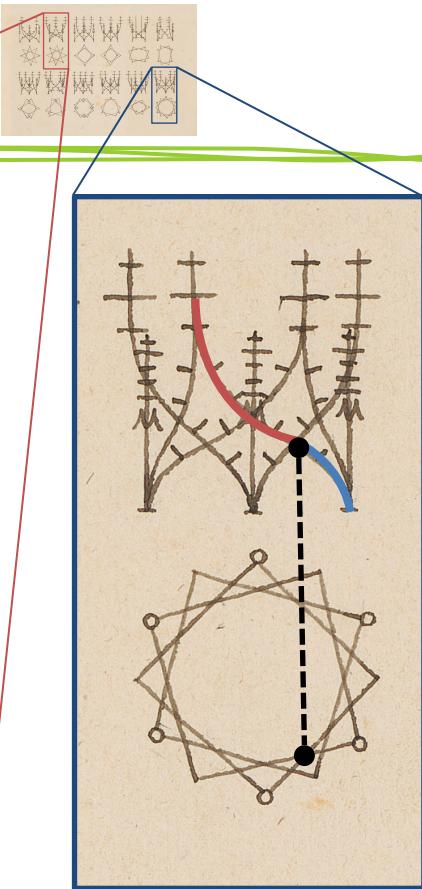
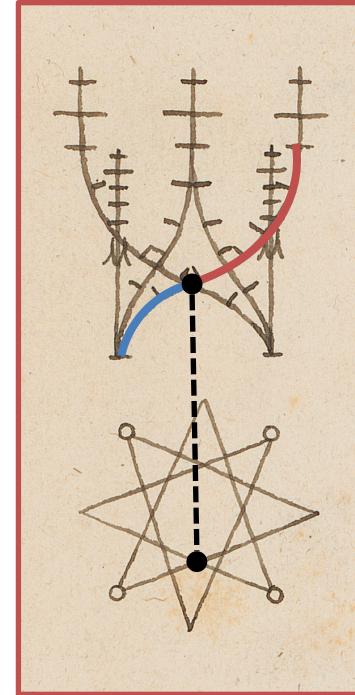
# Teaching Sheet

- Marked vertices are ground points
- Endpoints have vertical tangents
- Side view resembles ogee arc



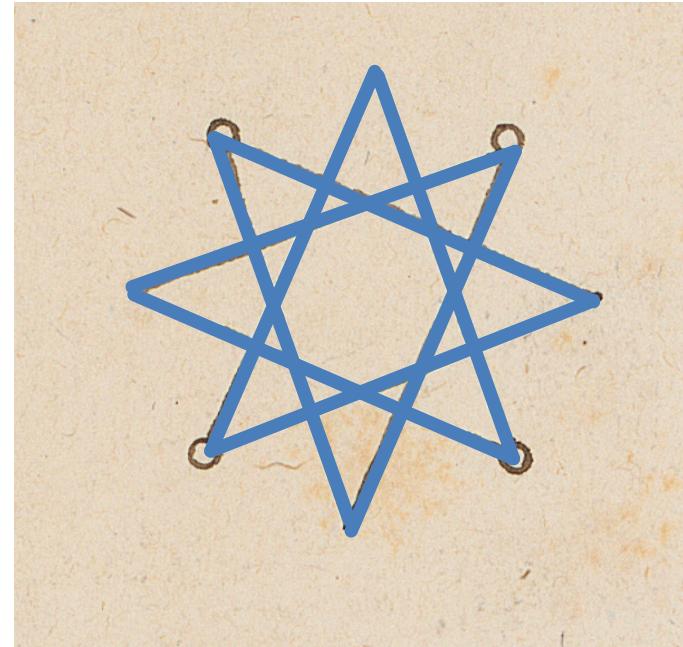
# Teaching Sheet

- Marked vertices are ground points
- Endpoints have vertical tangents
- Side view resembles ogee arc
- Inflection point projected to an intersection

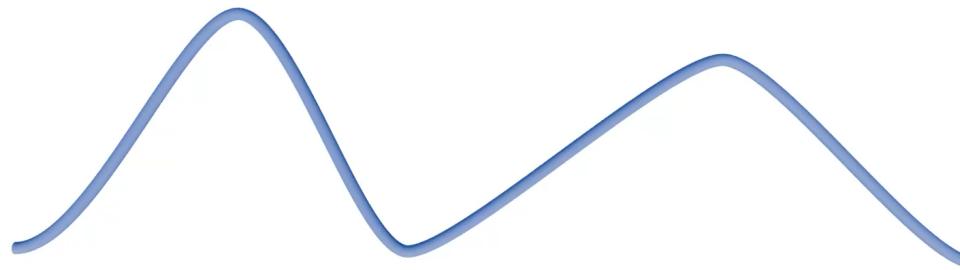


# Designing Gothic Curve Networks

- Draw a top-view unit curve
  - Apply reflection symmetry
  - Apply rotation symmetry
- Reconstruct side-view bi-arc
  - View dependent?
  - Non-bijective projection?



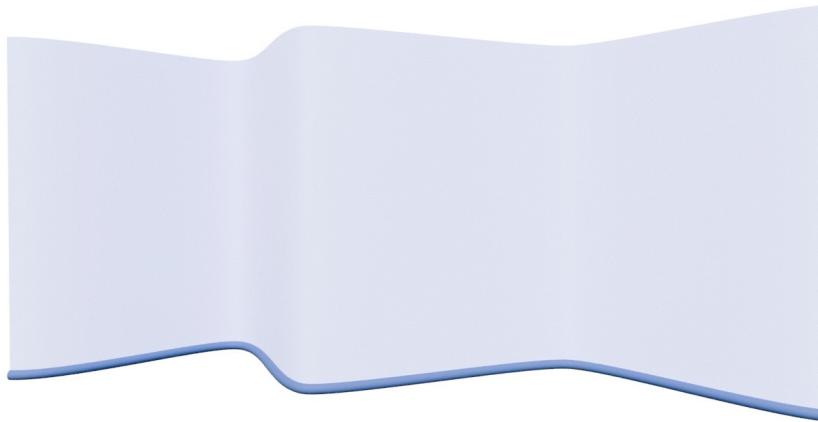
# Curve Parameterization



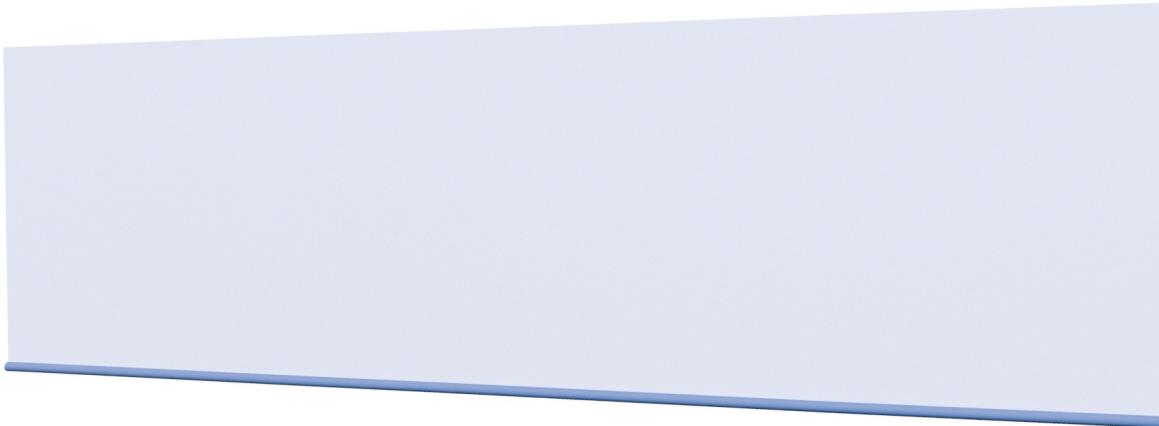
# Curve Parameterization



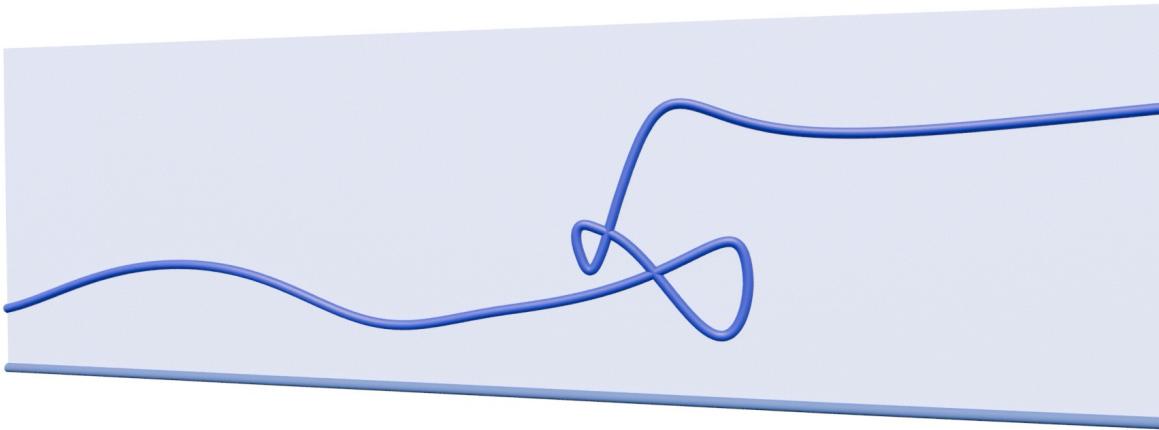
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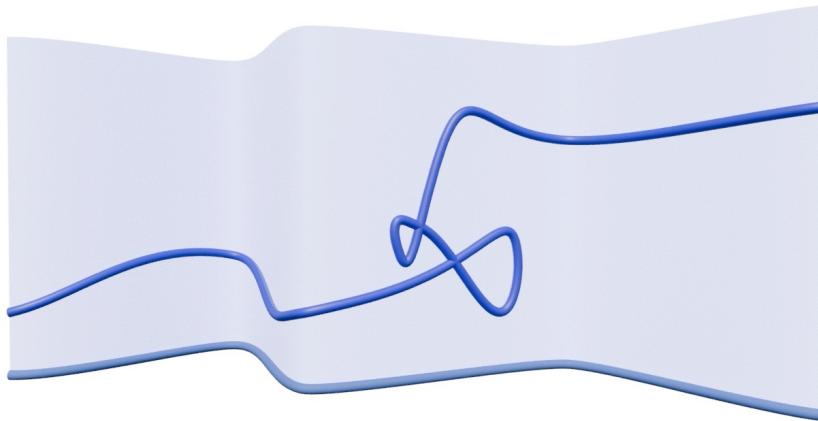
# Curve Parameterization



# Curve Parameterization



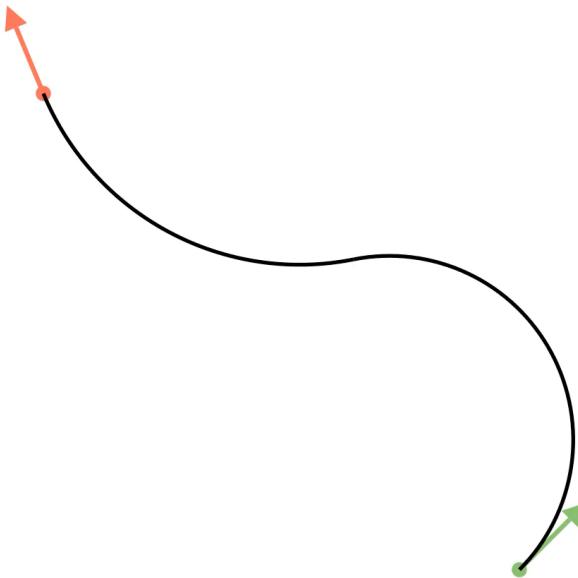
# Curve Parameterization



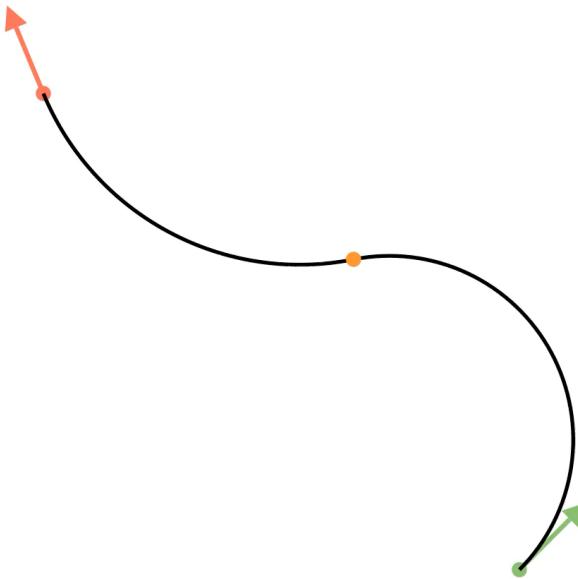
# Bi-arc Reconstruction



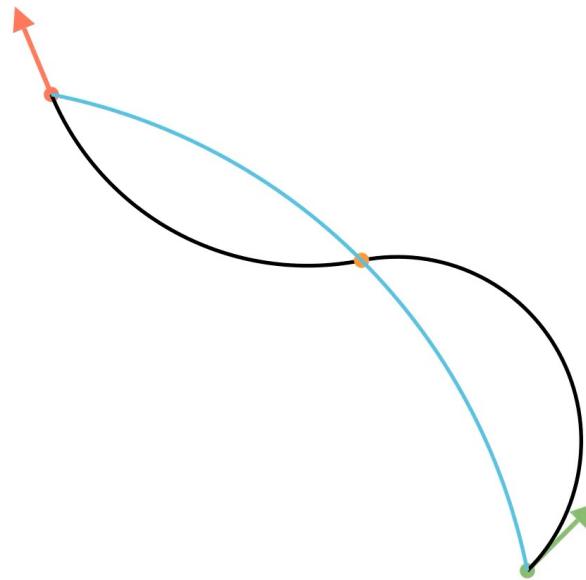
# Bi-arc Reconstruction



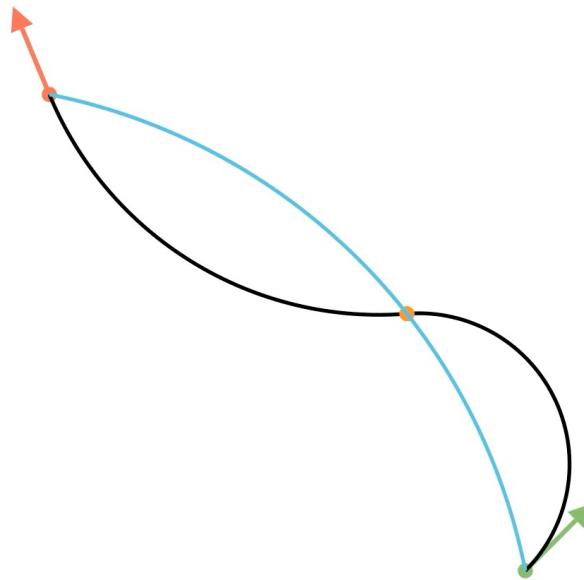
# Bi-arc Reconstruction



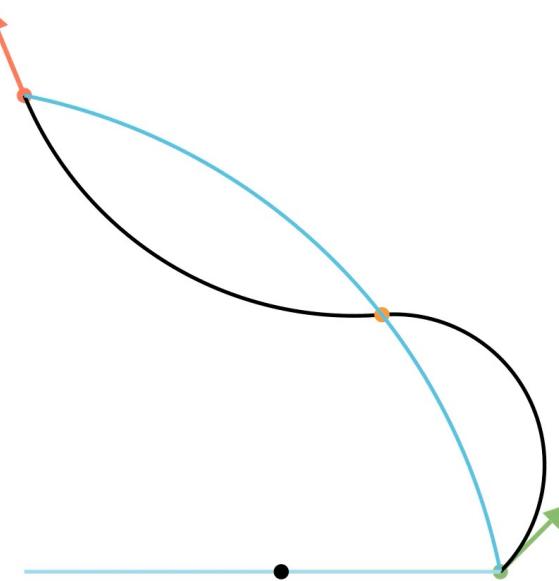
# Bi-arc Reconstruction



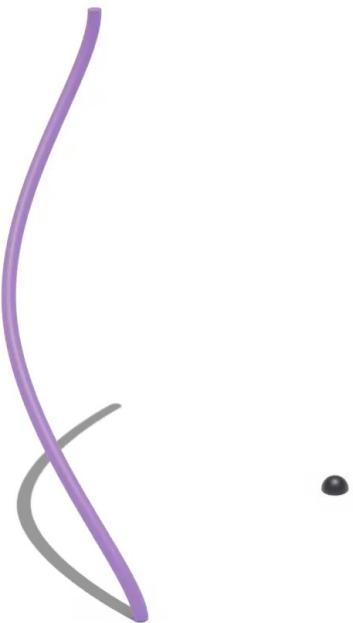
# Bi-arc Reconstruction



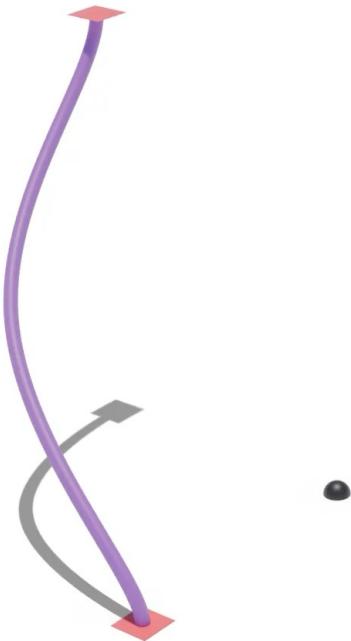
# Bi-arc Reconstruction



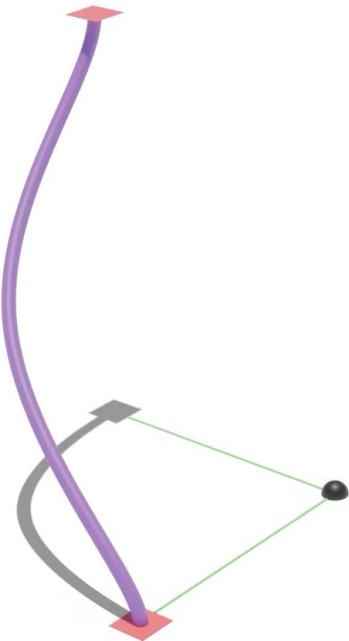
# Surface Reconstruction



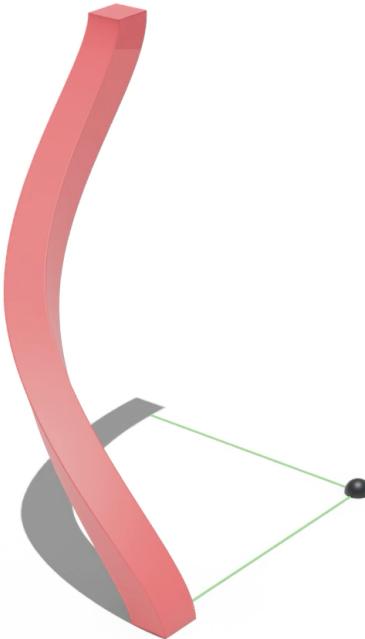
# Surface Reconstruction



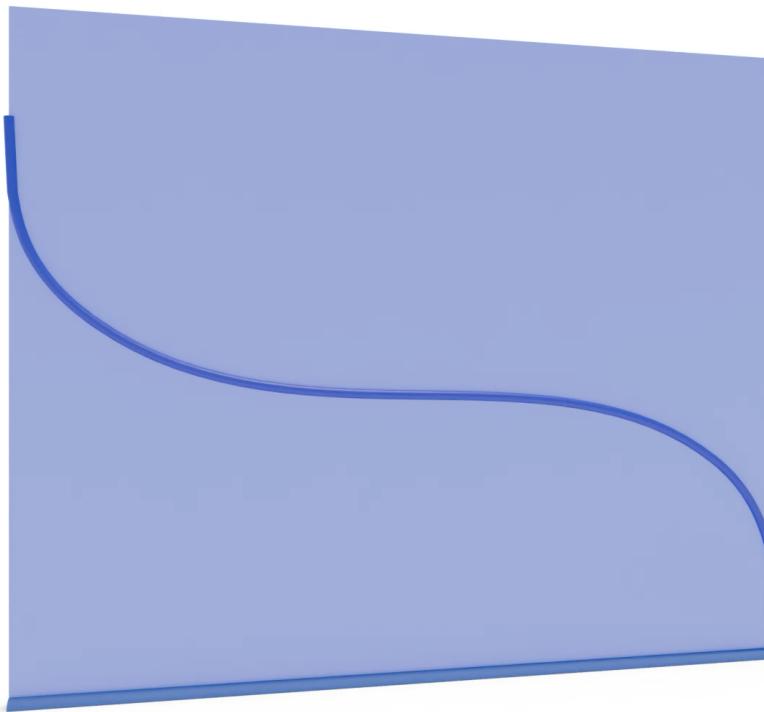
# Surface Reconstruction



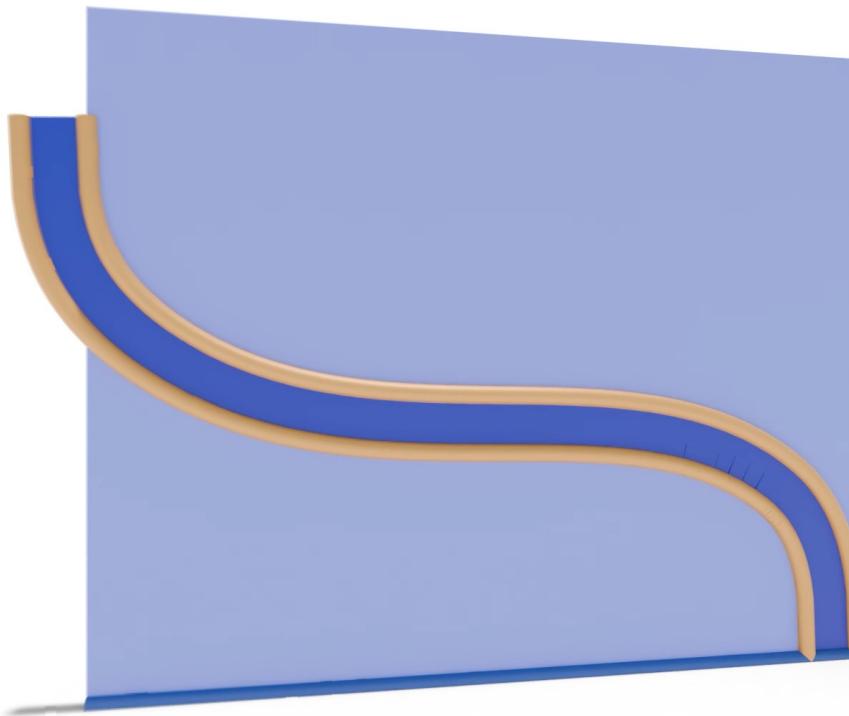
# Surface Reconstruction



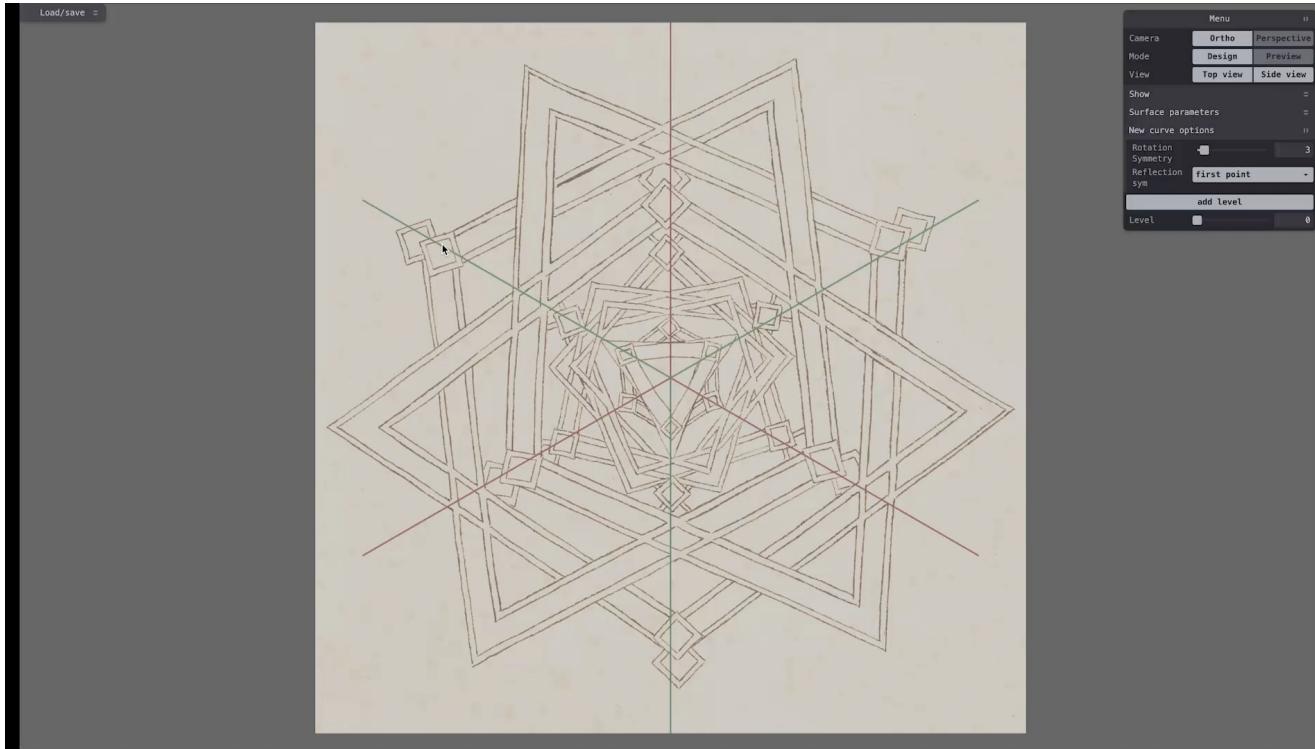
# Ribbon Reconstruction



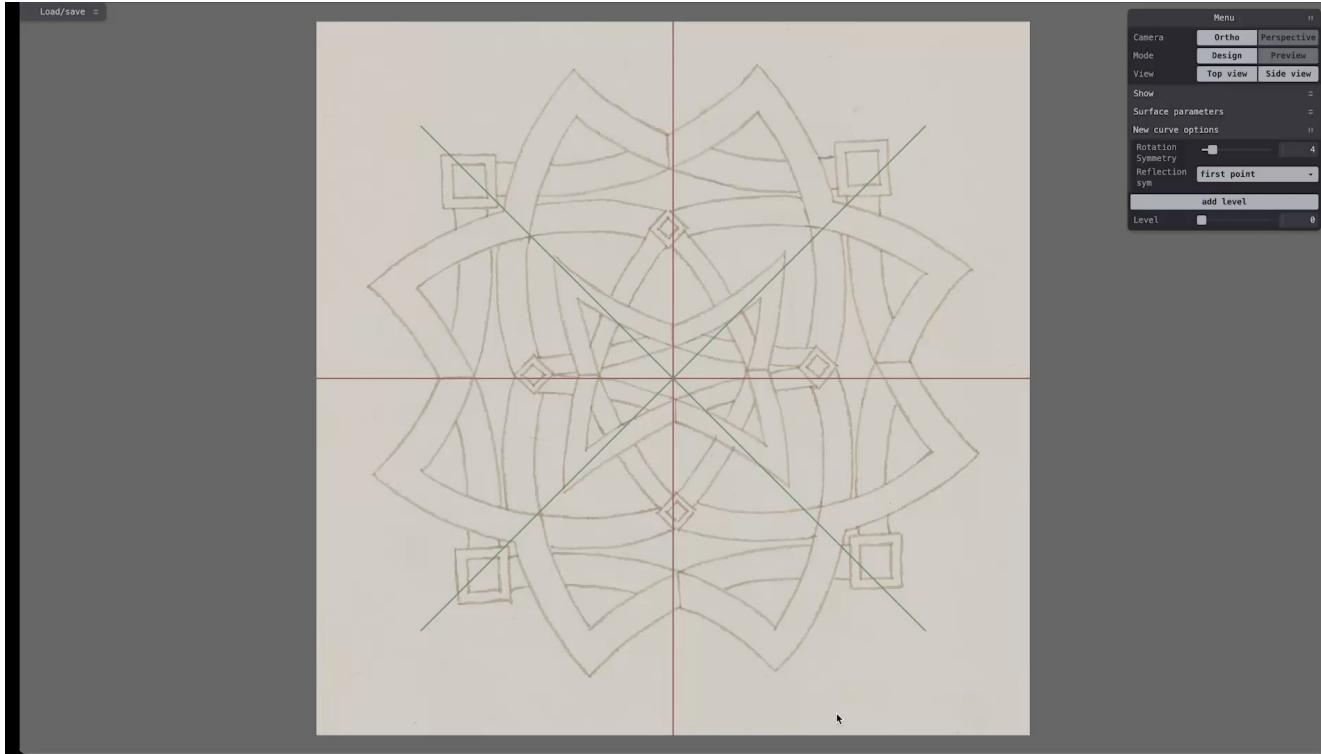
# Ribbon Reconstruction



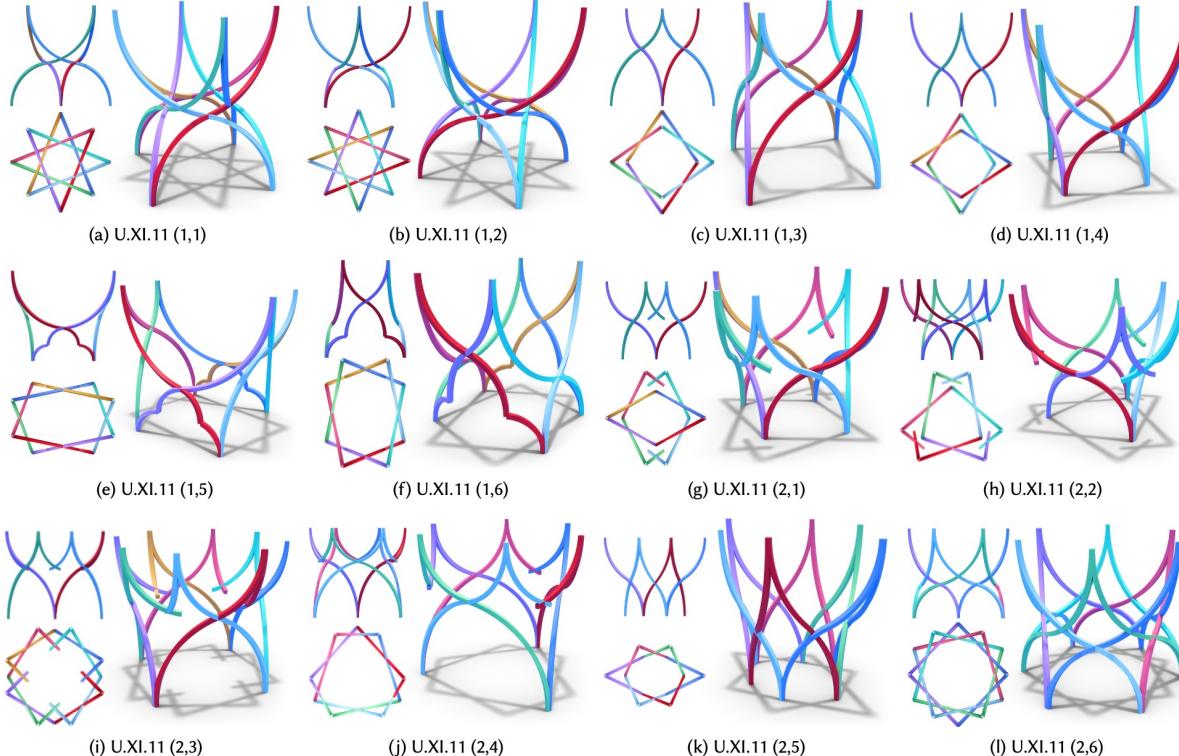
# Demo - Design Tool



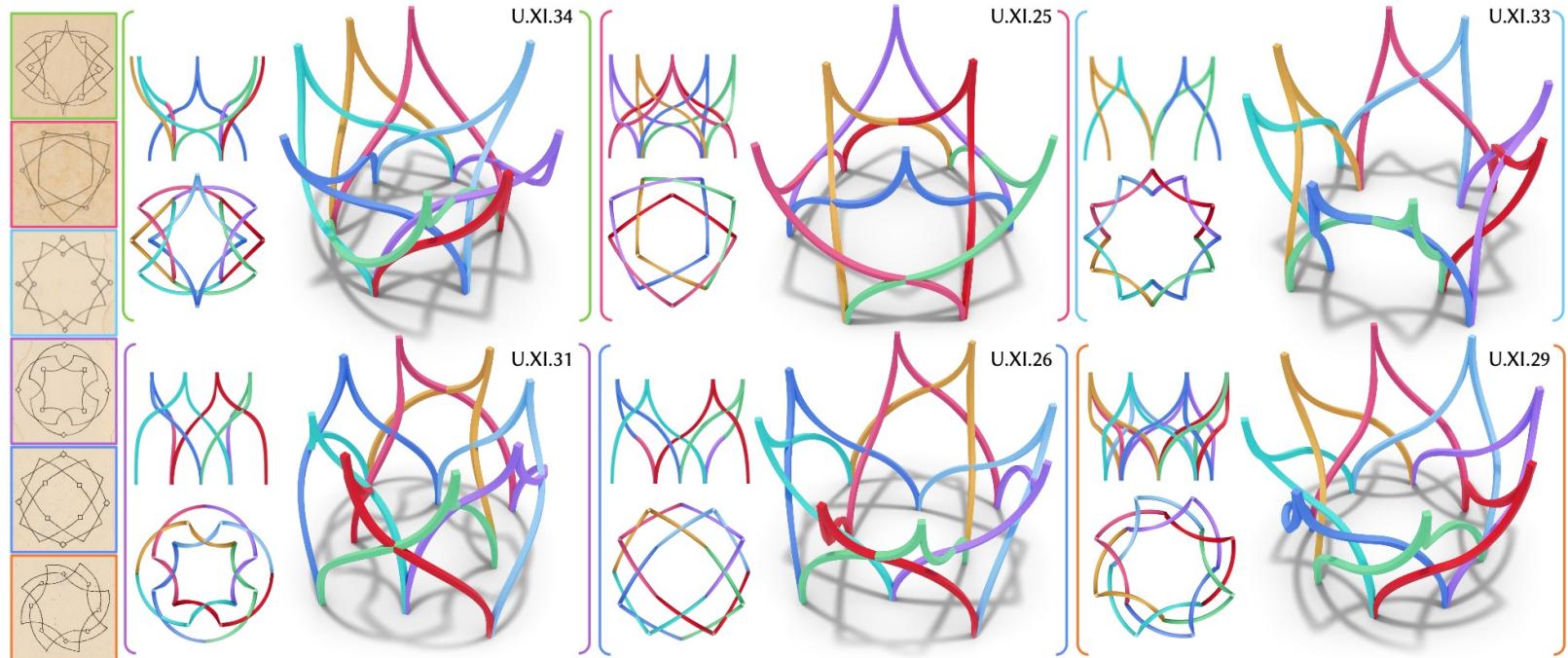
# Demo - Design Tool



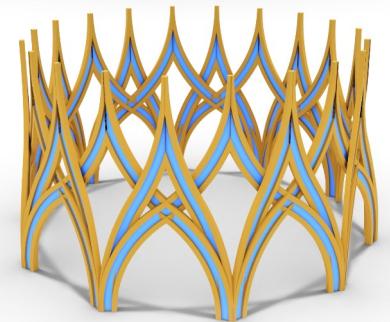
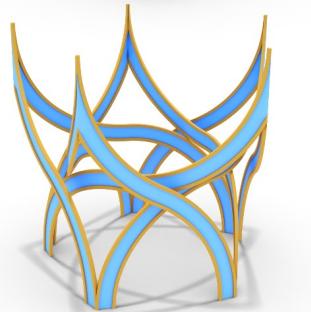
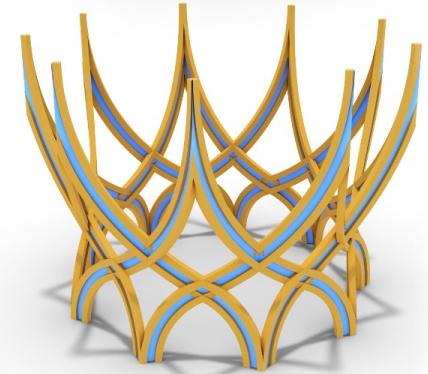
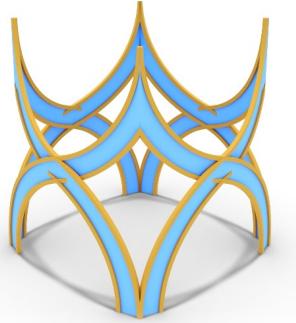
# Results - Teaching Sheet



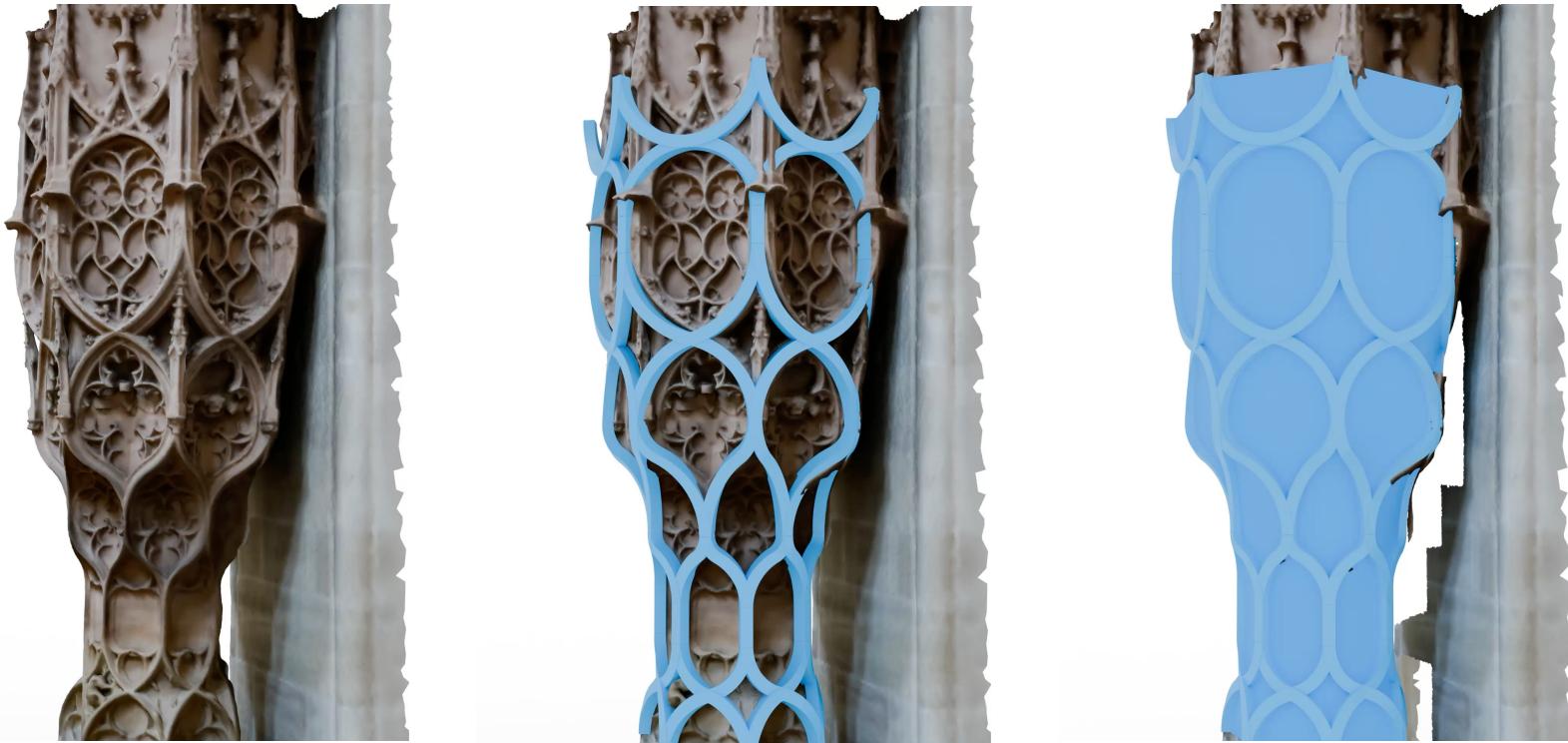
# Results - Curved Top-Views



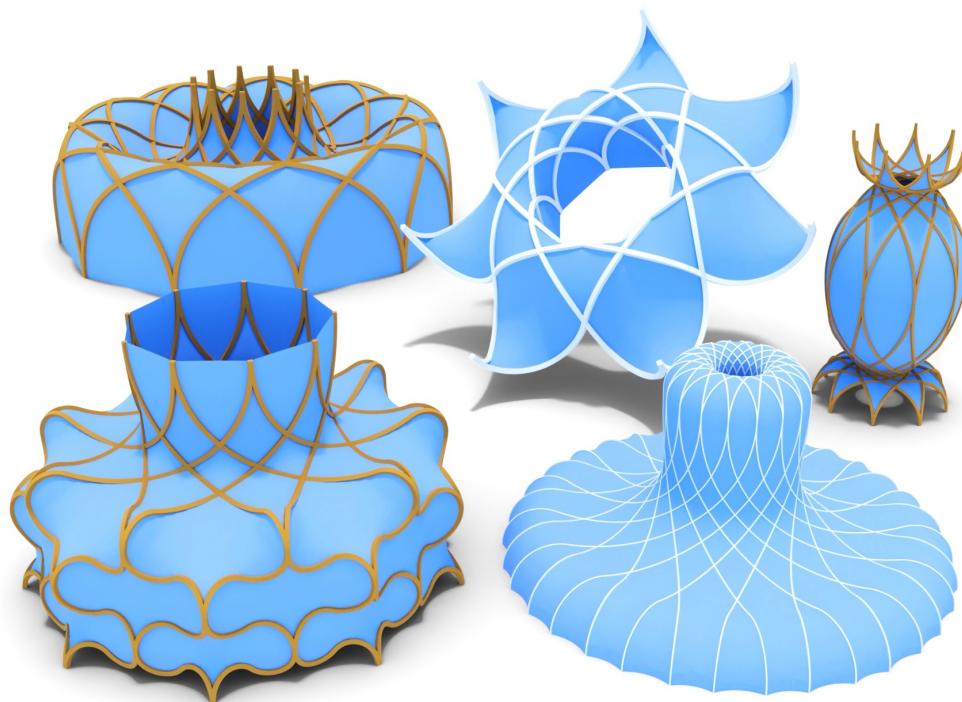
# Results



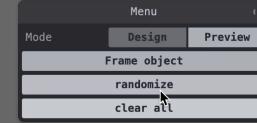
# Results - 3D Scan



# Results - Freeform Design

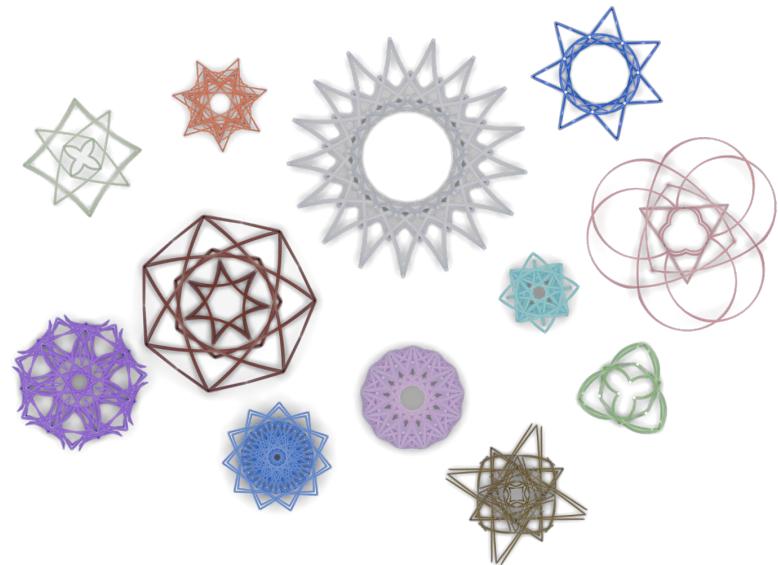
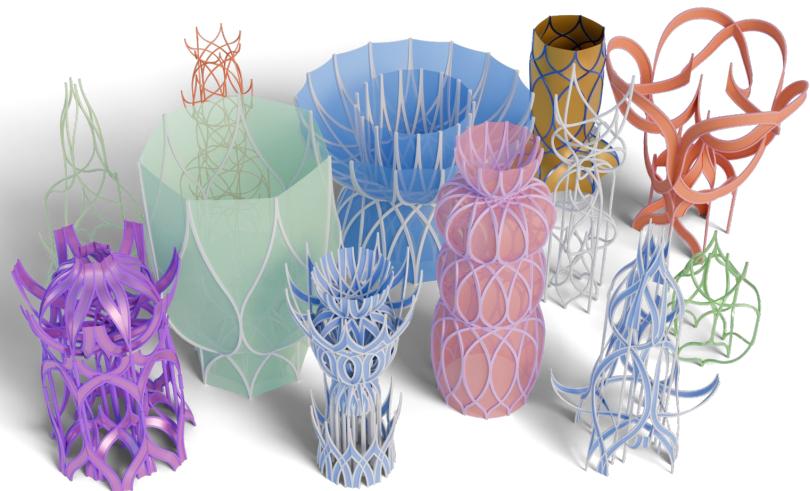


# Future Work



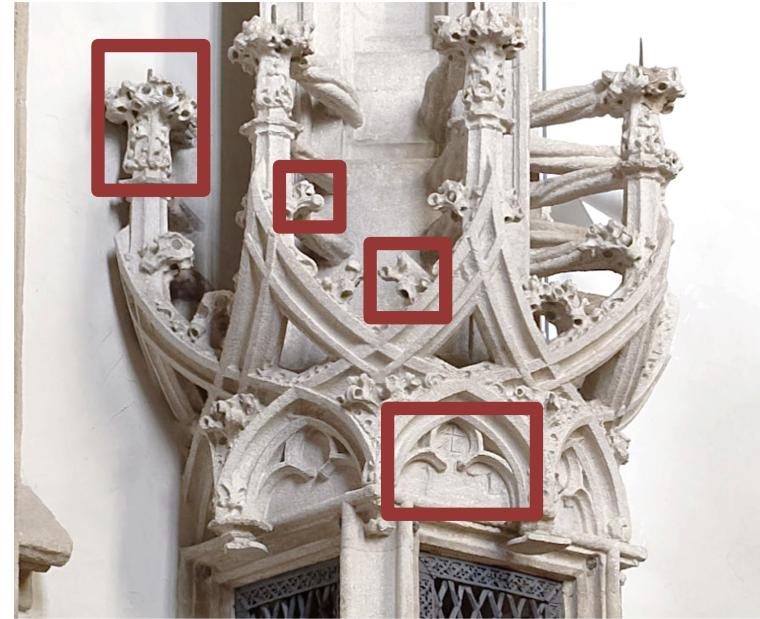
# Future Work

Procedural modeling/generation

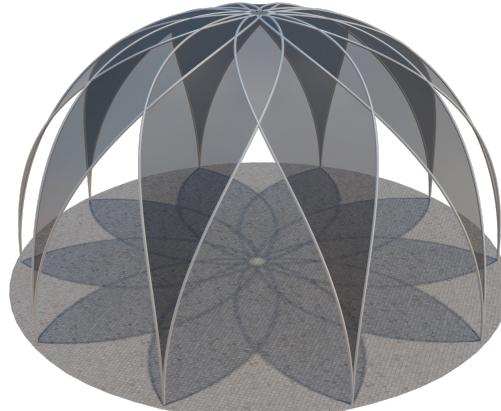
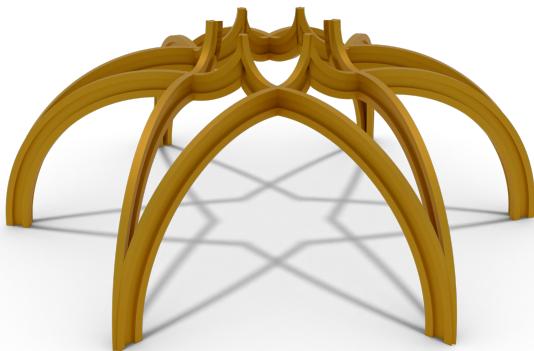


# Future Work

Adding decorations



# Thank You for your attention



The authors express gratitude to the anonymous reviewers for their valuable feedback. The authors are deeply grateful to the Kunstmuseum Basel, especially to Ariane Mensger, for facilitating access to study the drawings in person. Special thanks to Ningfeng Zhou for proofreading and to Marcel Padilla for his spiritual guidance. The authors also extend their thanks to all IGL members for the discussions and support. This work was supported in part by the ERC Consolidator Grant No. 101003104 (MYCLOTH).