(III) POLYHEDRA

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Unfolding:

- OPEN: edge unfolding convex polyhedra [Dürer 1525]
  - every polyhedron we've tried unfolds
  - every algorithm we've tried fails on some example (except exhaustive search) [Schlickenrieder 1997]
  - false for nonconvex polyhedra & even triangulated [Bern et al. 2001]
- general unfolding
  - possible for convex polyhedra [Agarwal et al. 1997; Sharir & Schorr 1986]
  - OPEN for general polyhedra (~sphere)
- vertex unfolding
  - possible for triangulated manifolds [Demaine, Eppstein, Erickson, Hart, O'Rourke 2002]
  - OPEN for e.g. convex polyhedra

Folding: glue polygon boundary to itself to form convex polyhedron

- exponential-time algorithm to list all gluings [Demaine, Demaine, Lubiw, O'Rourke 2002]
  - output can be exponential ⇒ optimal in worst case
- poly.-time for 1 gluing, edge-to-edge [Lubiw & O'Rourke 1996]
- OPEN: construct the 3D polyhedra resulting from gluings
  - best algorithm is at least exponential [Sabitov 1996]