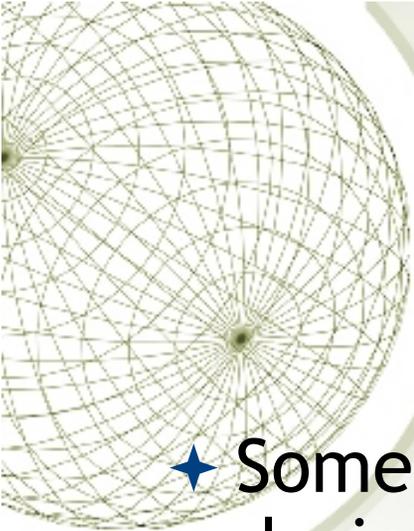


Diff Geom of Curves

- ★ Theoretical and computational
- ★ Interdisciplinary: unification of many topics including geometry, spatial visualization, calculus, linear algebra, differential equations, and complex variables along with various topics from the sciences, including physics
- ★ Numerous applications

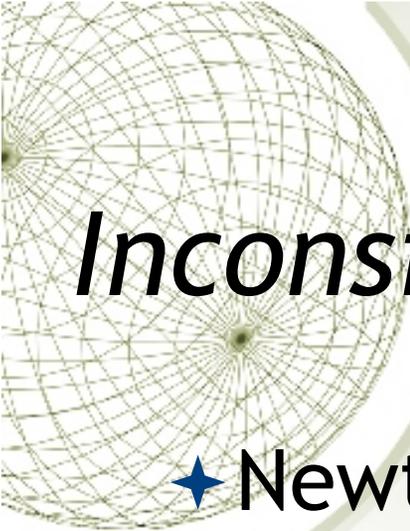


Curves

- ★ Some of the results were motivated by the desire for more accurate clocks:

I have been occupied with a new discovery... In order to make my clock even more exact.... What, however, I never had expected I would discover, I have now hit upon, the undoubtedly true shape of curves... I determined it by geometric reasoning.

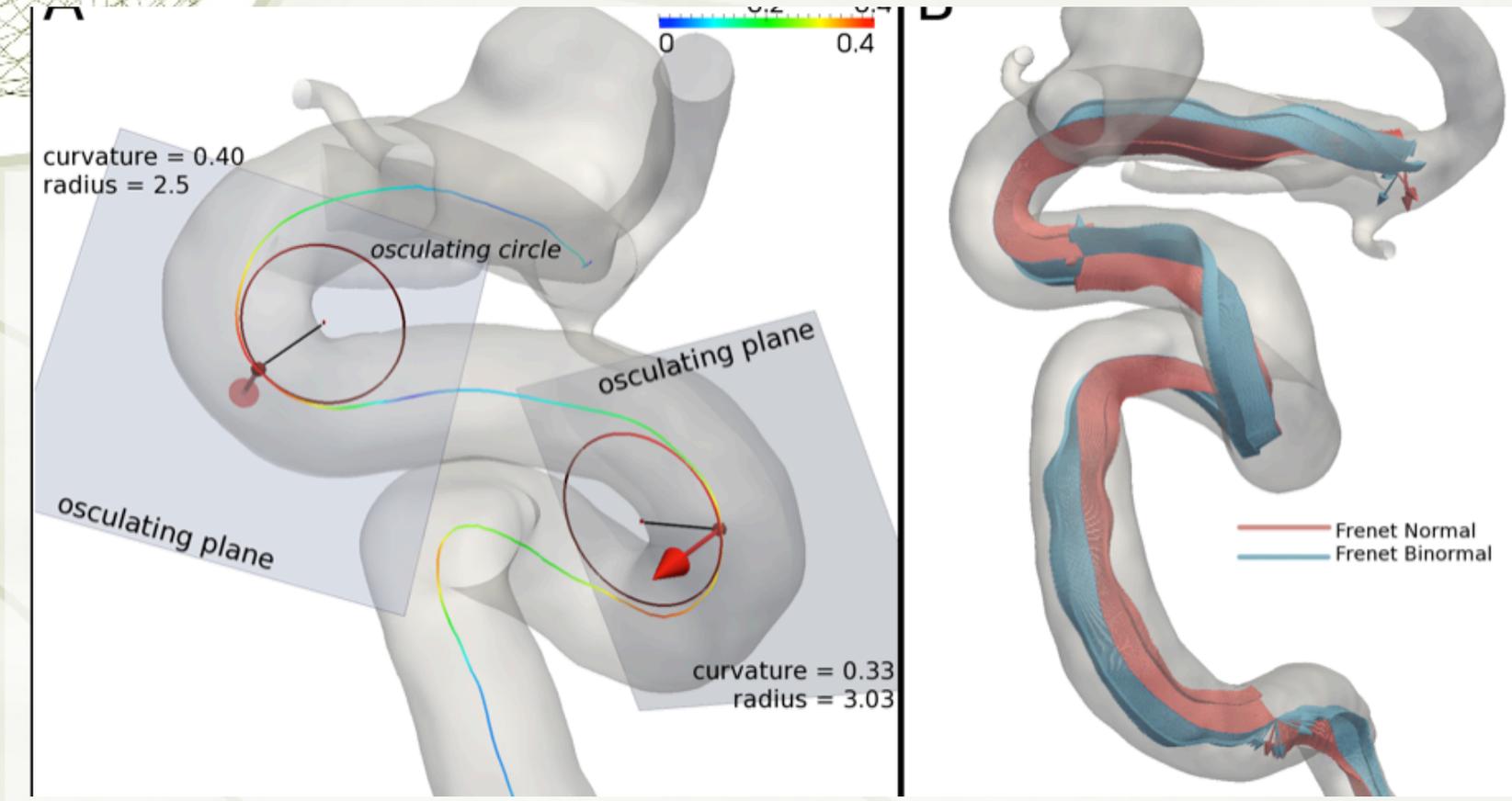
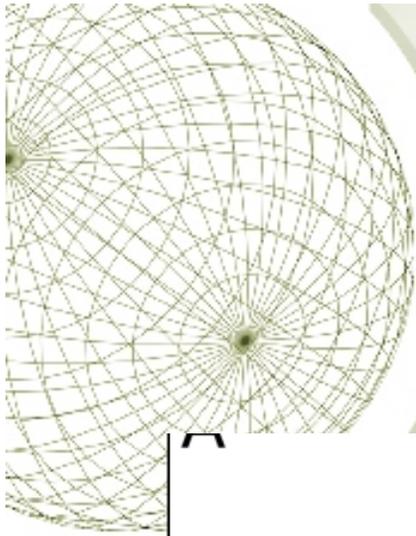
(C. Huygens December 1659)

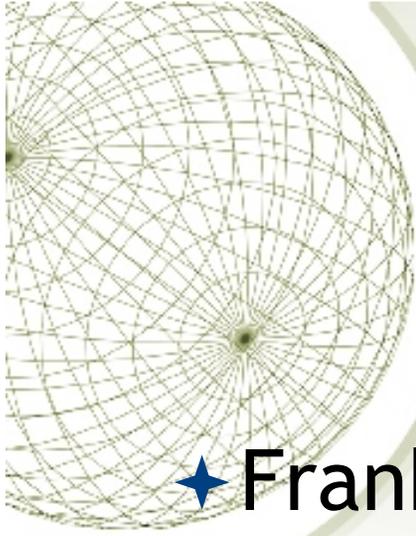


Inconsistency in Mercury's Orbit

- ★ Newton used solar gravitational attraction and calculus to explain Kepler's elliptical planetary orbits.
- ★ The orbit rotated (precessed) at an unexpected rate
- ★ General relativity and the geometry of space-time

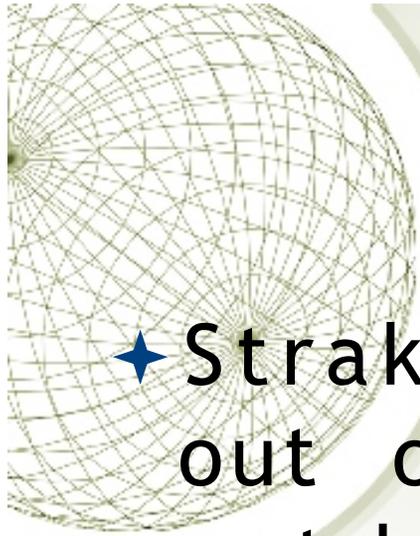
Vascular Tract





Smokestack Problem

- ★ Frank Morgan received a call from a company constructing a huge smokestack, which required the attachment of a spiraling strip or stake for structural support.



- ★ Strake cut out of flat metal pieces
- ★ What inner radius would make it fit best?

