

Geometry, Groups and Dynamics/GEAR Seminar  
(held at the Illinois hub of GEAR )

**12:00 pm, Tuesday, October 11, 2016, 243 Altgeld Hall**

**Alper Gur** (Indiana University)

**Hypersurfaces with Central Convex Cross-Sections**

The compact transverse cross-sections of a cylinder over a central ovaloid in  $\mathbf{R}^n$ ,  $n \geq 3$ , with hyperplanes are central ovaloids. A similar result holds for quadrics (level sets of quadratic polynomials in  $\mathbf{R}^n$ ,  $n \geq 3$ ). Their compact transverse cross-sections with hyperplanes are ellipsoids, which are central ovaloids. In  $\mathbf{R}^3$ , Blaschke, Brunn, and Olovjanischnikoff found results for compact convex surfaces that motivated B. Solomon to prove that these two kinds of examples provide the only complete, connected, smooth surfaces in  $\mathbf{R}^3$ , whose ovaloid crosssections are central. We generalize that result to all higher dimensions, proving: *If  $M^{n-1} \subseteq \mathbf{R}^n$ ,  $n \geq 4$ , is a complete, connected, smooth hypersurface, which intersects at least one hyperplane transversally along an ovaloid, and every such ovaloid on  $M$  is central, then  $M$  is either a cylinder over a central ovaloid or a quadric.*

[Video](#)