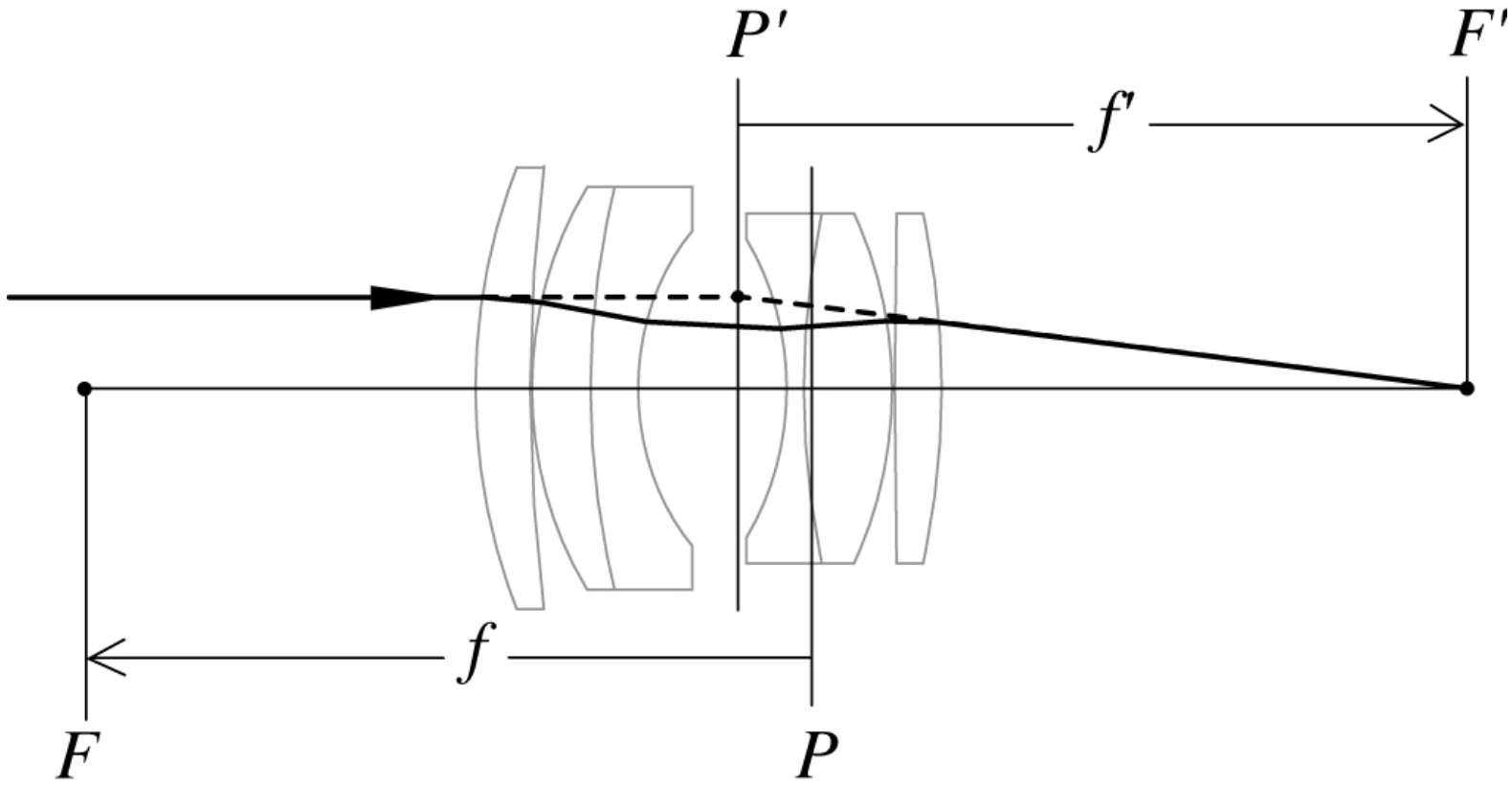
CS 563 Advanced Graphics
Time-varying BRDFs: Weathering, etc

by Emmanuel Agu

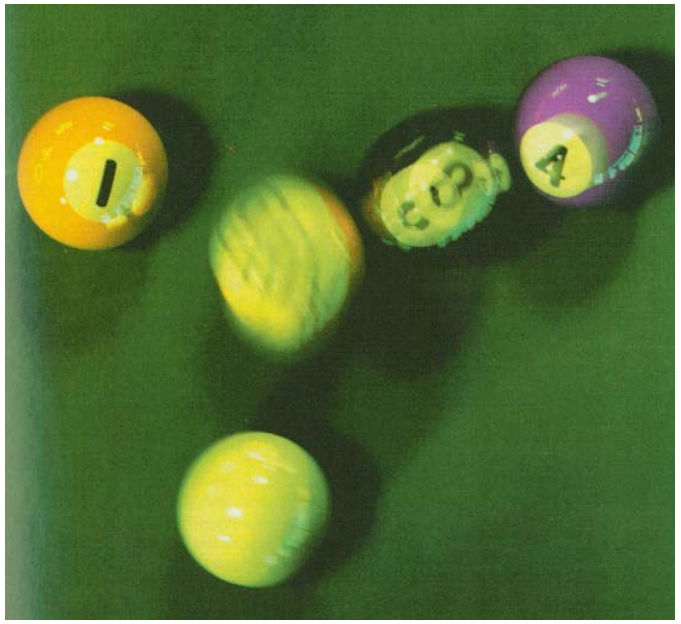
Physically-based Camera

- **Kolb et al, *SIGGRAPH 1995***
- Pin-hole camera too simplistic, everything in focus
- Real camera has multi-lens assemblies
- Has different imaging characteristics such as limited depth of field, field distortion, vignetting and spatially varying exposure.



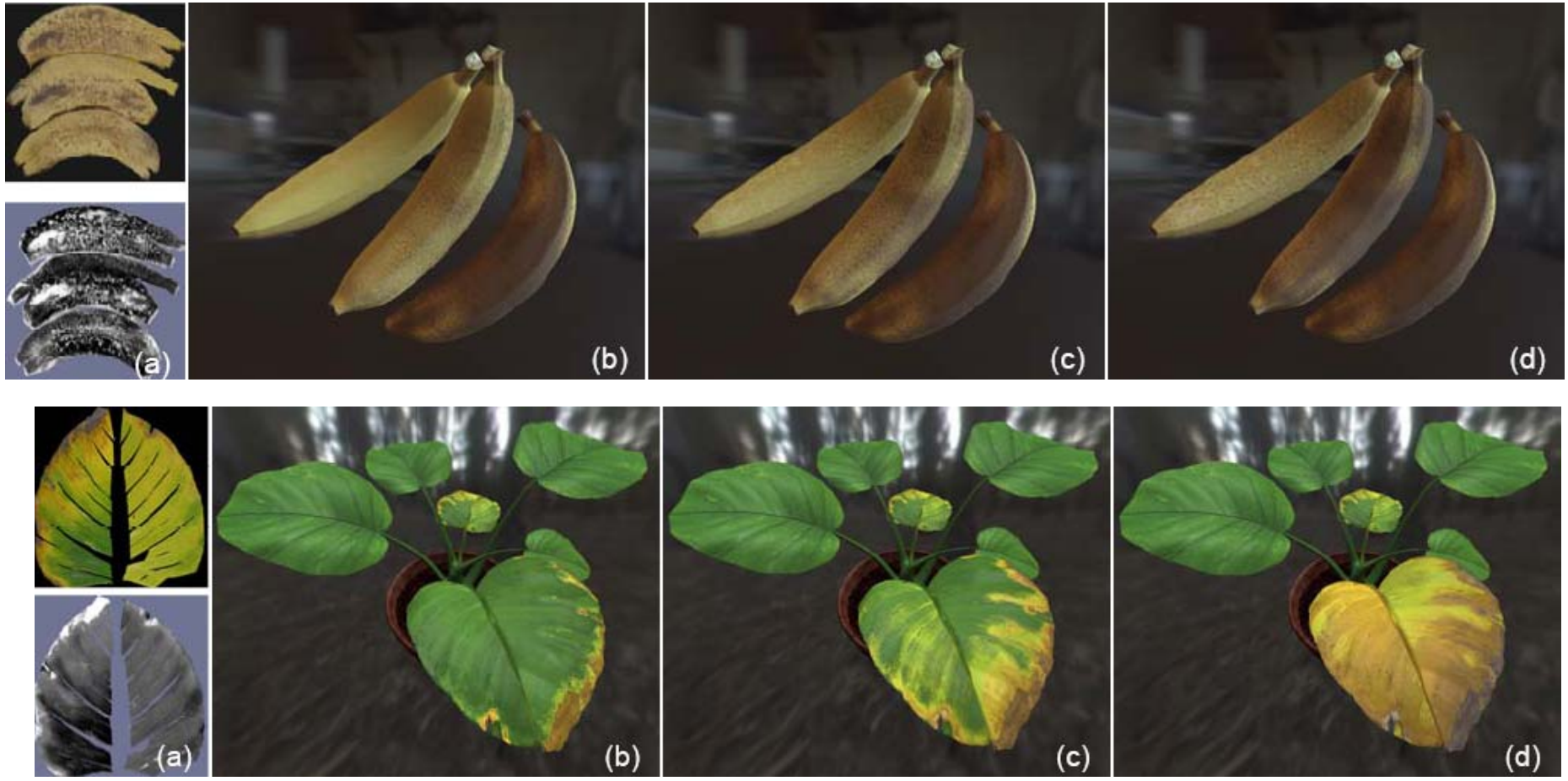
Motion Blur

- Motion blur
  - Notion of time
  - Average out what you see through a pixel at different times
  - Cast multiple rays from eye through same point in each pixel
  - Each of these rays intersects the scene at a different time
  - Reconstruction filter controls shutter speed, length



Time-varying BRDF

- BRDF: How different materials reflect light
- Time varying?: how reflectance changes over time
- Examples: weathering, ripening fruits, rust, etc



TV BRDF Recent Developments

- J. Wang, X. Tong, S. Lin, M. Pan, C. Wang, H. Bao, B. Guo and H. Shum, "Appearance Manifolds for Modeling Time-Variant Appearance of Materials" (Video), ACM Trans on Graphics, Vol. 25, No. 3, 2006 (Siggraph '06 Proceedings)

  SIGGRAPH VIDEO

- Bo Sun , Kalyan Sunkavalli , Ravi Ramamoorthi , Peter N. Belhumeur , Shree K. Nayar, Time-Varying BRDFs, IEEE Transactions on Visualization and Computer Graphics, v.13 n.3, p.595-609, May 2007

  VIDEO