



Professor Joseph D. Paulsen

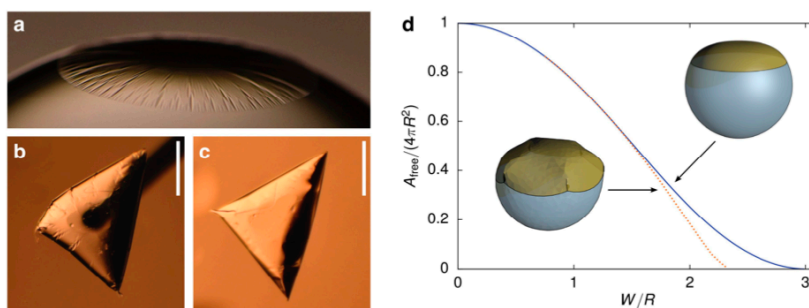


Figure 7

Optimal wrapping with ultrathin sheets (86). (a) A circular polystyrene sheet of thickness $t = 39$ nm and radius $W = 1.5$ mm on a large water droplet in oil. (b) A circular sheet of thickness $t = 29$ nm deforms a small droplet into a triangular shape. (c) The same overall shape occurs for a circular $t = 241$ nm sheet. Scale bar: 1 mm. (d) Normalized exposed interfacial area, $A_{free}/(4\pi R^2)$, versus the ratio W/R , where R is the radius of a spherical droplet with the same volume. Smaller A_{free} is energetically favored for any W/R . Solid line: optimal axisymmetric wrapping. Dashed line: results from numerical simulations, which find lower-energy states for small droplets (large W/R). Adapted from Reference 86.

From: Paulsen JD, Demery V, Santangelo CD, Russell TP, Davidovitch B, Menon N (2015) Optimal wrapping of liquid droplets with ultrathin sheets. *Nature Materials* 14(12):1206-1209

See:

<http://thecollege.syr.edu/people/faculty/pages/phy/paulsen-joseph.html>

http://thecollege.syr.edu/news/2017/Paulsen_NSF_CAREER_grant.html

<https://scholar.google.com/citations?user=FZIO0UwAAAAJ&hl=en>

Head, Joseph Paulsen Laboratory, Department of Physics
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Biography:

Paulsen joined the Syracuse physics department in 2015 after spending two years at the University of Massachusetts Amherst as a postdoctoral research associate. He received his Ph.D. in physics from the University of Chicago, and is a member of the American Association of Physics Teachers and the American Physical Society.

Awards:

February 2017: Five-year Faculty Early Career Development Program (CAREER) grant from the National Science Foundation.

October 2016: Joseph Paulsen Lab Awarded Grant from American Chemical Society

Selected Publications:

Paulsen JD, Demery V, Santangelo CD, Russell TP, Davidovitch B, Menon N (2015) Optimal wrapping of liquid droplets with ultrathin sheets. *Nature Materials* 14(12):1206-1209

Joseph D. Paulsen, Evan Hohfeld, Hunter King, Jiangshui Huang, Zhanlong Qiu, Thomas P. Russell, Narayanan Menon, Dominic Vella and Benny Davidovitch, "Curvature-induced stiffness and the spatial variation of wavelength in wrinkled sheets", *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, Vol. 113, No. 5, pp 1144-1149, February 2016

Dominic Vella, Hamid Ebrahimi, Joseph Paulsen, Ashkan Vaziri, Narayanan Menon, and Benny Davidovitch, "Poking around: how indentation reveals wrinkly isometries", Abstract ID BAPS.2016.MAR.P40.2

Joseph D. Paulsen, Vincent Demery, K. Bugra Toga, Zhanlong Qiu, Benny Davidovitch, Thomas P Russell and Narayanan Menon, "Geometry-driven folding transitions in floating thin films", Abstract ID BAPS.2016.MAR.P40.3

Joseph D. Paulsen, Vincent Démery, K. Buğra Toga, Zhanlong Qiu, Thomas P. Russell, Benny Davidovitch, and Narayanan Menon, "Geometry-driven folding of a floating annular sheet", *Phys. Rev. Lett.* 118, No. 4, 048004 – Published 27 January 2017

Deepak Kumar, Joseph D Paulsen, Thomas P Russell, Narayanan Menon, "Wrapping with a splash: High-speed encapsulation with ultrathin sheets", *Science*, Vol. 359, No. 6377, pp 775-778, February 16 2018

Chang J, Toga KB, Paulsen JD, Menon N, & Russell TP (2018) Thickness Dependence of the Young's Modulus of Polymer Thin Films. *Macromolecules*.

Ripp MM, Démary V, Zhang T, & Paulsen JD (2018) Geometric stiffening and softening of an indented floating thin film. arXiv preprint arXiv:1804.02421.

Joseph D. Paulsen, "Wrapping liquids, solids, and gases in thin sheets", *Annual Review of Condensed Matter Physics*, Vol. 10, pp 431-450, March 2019