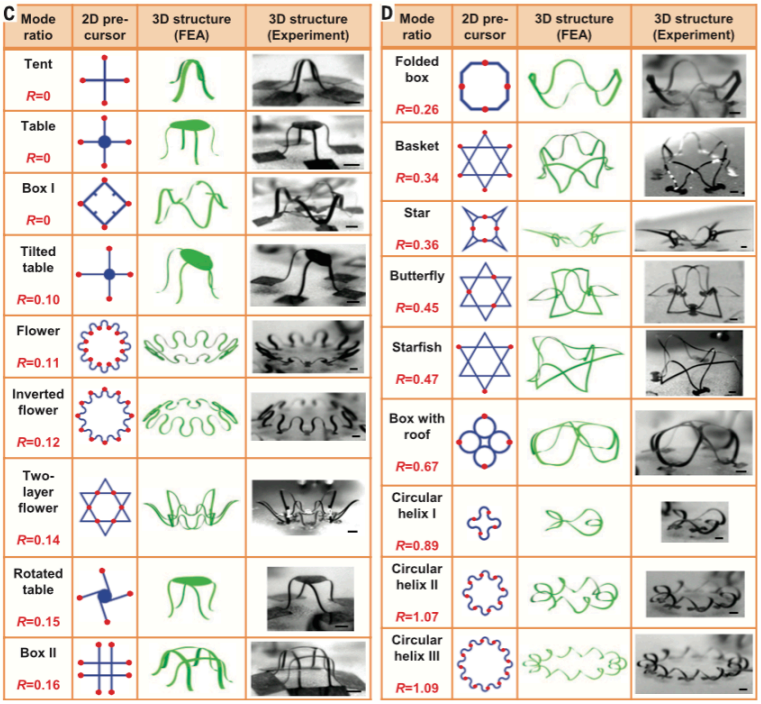
Dr. Zheng Yan



Two-dimensional structures that buckle into 3-D structures

(from: "Assembly of micro/nanomaterials into complex, three-dimensional architectures by compressive buckling", Science, Vol. 347, No. 6218, 9 January 2015)

See:
http://www.researchgate.net/profile/Zheng_Yan2
https://scholar.google.com/citations?user=7c-l8ykAAAAJ&hl=en

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Sheng Xu, Zheng Yan, Kyung-In Jang, Wen Huang, Haoran Fu, Jeonghyun Kim, Zijun Wei, Matthew Flavin, Joselle McCracken, Renhan Wang, Adina Badea, Yuhao Liu, Dongqing Xiao, Guoyan Zhou, Jungwoo Lee, Ha Uk Chung, Huanyu Cheng, Wen Ren, Anthony Banks, Xiuling Li, Ungyu Paik, Ralph G. Nuzzo, Yonggang Huang, Yihui Zhang, and John A. Rogers, "Assembly of micro/nanomaterials into complex, three-dimensional architectures by compressive buckling", Science, 9 January 2015: 154-159
ABSTRACT: Complex three-dimensional (3D) structures in biology (e.g., cytoskeletal webs, neural circuits, and vasculature networks) form naturally to provide essential functions in even the most basic forms of life. Compelling opportunities exist for analogous 3D architectures in human-made devices, but design options are constrained by existing capabilities in materials growth and assembly. We report routes to previously inaccessible classes of 3D constructs in advanced materials, including device-grade silicon. The schemes

involve geometric transformation of 2D micro/nanostructures into extended 3D layouts by compressive buckling. Demonstrations include experimental and theoretical studies of more than 40 representative geometries, from single and multiple helices, toroids, and conical spirals to structures that resemble spherical baskets, cuboid cages, starbursts, flowers, scaffolds, fences, and frameworks, each with single- and/or multiple-level configurations.

Yan, Z., Peng, Z., Casillas, G., Lin, J., Xiang, C., Zhou, H., Yang, Y., Ruan, G., Raji, A. O., Samuel, E. L. G., Hauge, R. H., Yacaman, M. Jose. & Tour, J. M. (2014), “Rebar grapheme”, ACS Nano, 8 (5), 5061-5068.