



## Professor Tomohiro Tachi

From: T. Tachi, Rigid origami simulator, available at: <http://www.tsg.ne.jp/TT/software/>, 2007

See:

[https://scholar.google.com/citations?user=GxJqE\\_oAAAAJ](https://scholar.google.com/citations?user=GxJqE_oAAAAJ)

<https://tsg.ne.jp/TT/>

<https://formfindinglab.wordpress.com/2018/10/09/what-i-am-thinking-origami-artist-and-mathematician-tomohiro-tachi/>

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### Summary:

Tomohiro Tachi is an associate professor in graphic and computer sciences at the Graduate School of Arts and Sciences, the University of Tokyo. He studied architecture and received his Masters and Ph.D. degrees in engineering from the University of Tokyo. He has been designing origami since 2002 and exploring spatial and kinematic origami through computation. Tachi developed several software tools for origami design.

“Origamizer” (2008) generates the crease pattern on a sheet of paper that folds to a given three-dimensional polyhedral mesh. In 2017, he collaborated with Erik Demaine to prove that any polyhedron can be folded from a sheet of paper through an improved algorithm of Origamizer. Tachi is also active in proposing new computational methods for designing a class of origami called rigidly foldable origami, i.e., a deployable system composed of rigid panels and hinges. One of such design methods is the generalization of Miura-ori, which won the Hangai Prize in 2009. The method is implemented in “Freeform Origami” (2010), which, together with other computational origami tools, is available from his website. In addition, Tachi collaborated with Koryo Miura to first propose the idea of cellular origami. This work won the Tsuboi Award in 2013.

### Selected Publications:

T. Tachi, Rigid origami simulator, available at <http://www.tsg.ne.jp/TT/software/>, 2007

T. Tachi, Simulation of rigid origami. Origami 4, Fourth International Meeting of Origami Science, Mathematics, and Education, 2009, pp. 175–187

Tachi, T. (2009). Generalization of Rigid Foldable Quadrilateral Mesh Origami. Journal of the International Association for Shell and Spatial Structures, 50, 173–179.

- T. Tachi, 3D origami design based on tucking molecule, in *Origami 4, Fourth International Meeting of Origami Science, Mathematics, and Education*, 2009, pp. 259–272
- Tachi, T. (2009). One-DOF Cylindrical Deployable Structures with Rigid Quadrilateral Panels. In A. Domingo & C. Lazaro, eds., *Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2009*, 2295–2305, Universidad Politecnica de Valencia, Spain.
- Tachi, T. (2009). Simulation of Rigid Origami. In R.J. Lang, ed., *Origami 4: Fourth International Meeting of Origami Science, Mathematics, and Education (4OSME)*, 175–188, A K Peters.
- Tachi, T. 2010. Freeform variations of origami. *J. Geom. Graph*, 14, 203-215.
- Tachi, T. 2010. Origamizing polyhedral surfaces. *Visualization and Computer Graphics*, IEEE Transactions on, 16, 298-311.
- Tachi, T. (2010). *Architectural Origami - Architectural Form Design Systems based on Computational Origami*. Lecture notes for MIT 6.849, Fall 2010.
- Tachi, T. (2010). Freeform Rigid-Foldable Structure using Bidirectionally FlatFoldable Planar Quadrilateral Mesh. In C. Ceccato, L. Hesselgren, M. Pauly, H. Pottmann & J. Wallner, eds., *Advances in Architectural Geometry 2010*, 87–102, Springer Vienna.
- Tachi T 2010 Geometric considerations for the design of rigid origami structures *Proc. Int. Association for Shell and Spatial Structures (IASS) Symp. 2010 vol 12 pp 458–460*
- Miura, K. , and Tachi, T. , 2011, “ Synthesis of Rigid-Foldable Cylindrical Polyhedra,” pp. 1–10.
- Tachi, T. , 2011, “ Rigid Foldable Thick Origami,” *Origami 5: Fifth International Meeting of Origami Science, Mathematics, and Education*, CRC Press, Boca Raton, FL, pp. 253–264
- E.D. Demaine, M.L. Demaine, V. Hart, G.N. Price, T. Tachi, (Non)existence of pleated folds: how paper folds between creases. *Graphs Comb.* 27(3), 377–397 (2011)
- K. Miura, T. Kawasaki, T. Tachi, R. Uehara, R. Lang, P. Wang-Iverson (eds.), *Origami 6: Sixth International Meeting of Origami Science, Mathematics, and Education (American Mathematical Society, Providence, 2011)*
- Tachi, T. & Miura, K. Rigid-foldable cylinders and cells. *J. Int. Assoc. Shell Spat. Struct* 53, 217–226 (2012).
- Tachi, T. Design of infinitesimally and finitely flexible origami based on reciprocal figures. *J. Geom. Graph.* 16, 223–234 (2012).
- Yasuda, H. , Yein, T. , Tachi, T. , Miura, K. , and Taya, M. , 2013, “ Folding Behaviour of Tachi-Miura Polyhedron Bellows,” *Proc. R. Soc. A*, 469(2159), pp. 1–18.
- T. Tachi, Freeform origami, available at <http://www.tsg.ne.jp/TT/software/>, 2013
- Tachi, T. 2013. Designing freeform origami tessellations by generalizing Resch's patterns. *Journal of mechanical design*, 135, 111006
- Cheung, K. C., Tachi, T., Calisch, S. & Miura, K. Origami interleaved tube cellular materials. *Smart Materials and Structures* 23, 094012 (2014).
- Filipov, E. T. , Tachi, T. , and Paulino, G. H. , 2015, “ Origami Tubes Assembled Into Stiff, Yet Reconfigurable Structures and Metamaterials,” *Proc. Natl. Acad. Sci.*, 112(40), pp. 12321–12326
- Dudte, L. H., Vouga, E., Tachi, T. & Mahadevan, L. Programming curvature using origami tessellations. *Nat. Mater.* 15, 583–588 (2016).
- Filipov, E. T. , Paulino, G. H. , and Tachi, T. , 2016, “Origami Tubes With Reconfigurable Polygonal Cross-Sections,” *Proc. R. Soc. A*, 472(2185), p. 20150607.
- T. Tachi, Designing rigidly foldable horns using Bricard's octahedron. *J. Mech. Robot.* 8(3), 031008 (2016)
- Tomohiro Tachi, “Introduction to Structural Origami”, *Journal of the International Association for Shell and Spatial Structures*, Vol. 60 (2019) No. 1 March n. 199, pp. 7-18(12)