

Life After NILM

George Hart

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`http://georgehart.com`

Outline

- Early history of NILM (NALM, NIALM, ...)
- Continuity throughout my life
- Current Work
 - Sculpture
 - Educational Workshops
- Lessons Learned

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Early History of NILM

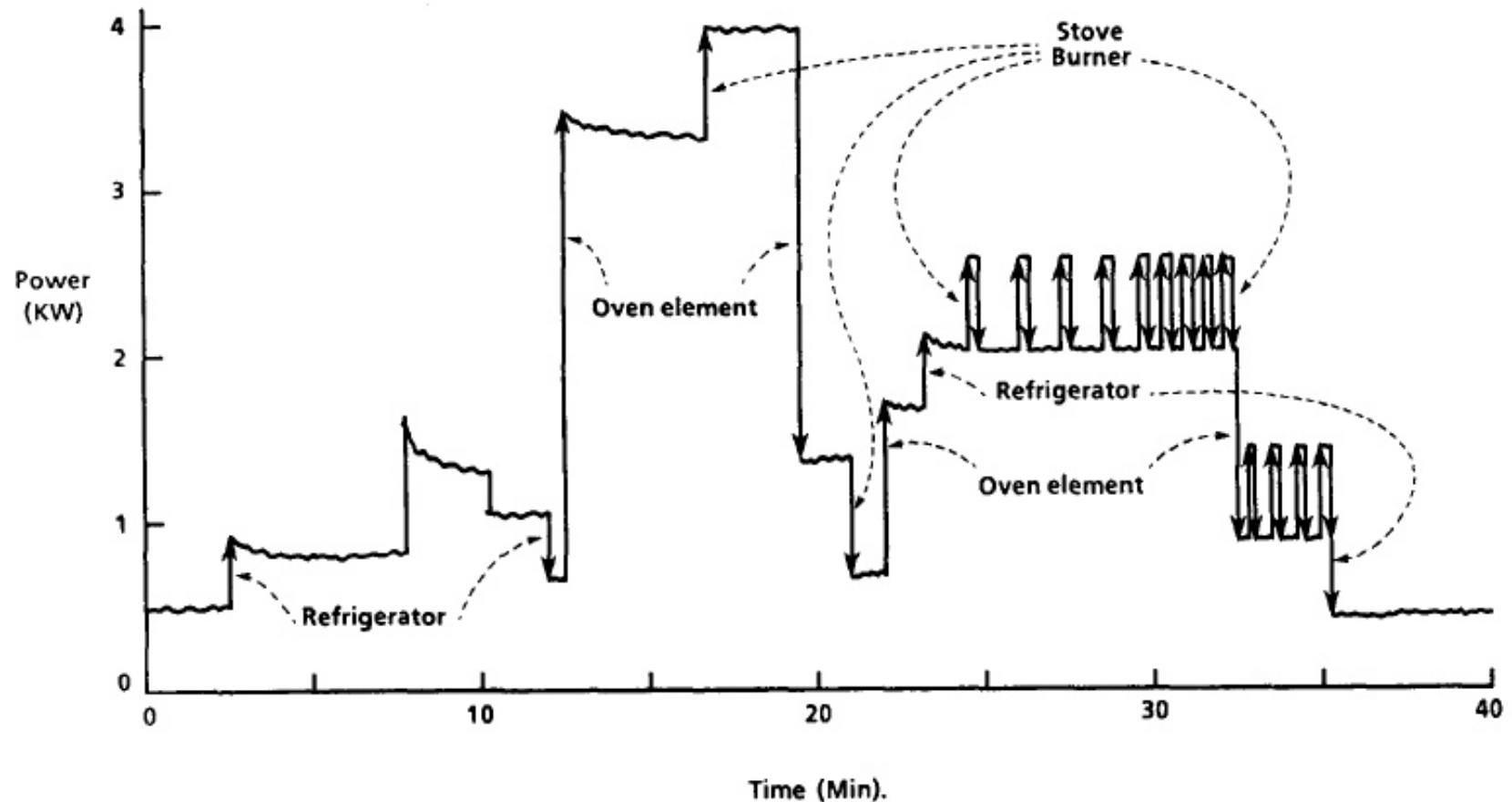


Fig. 2. Power versus time (total load) shows step changes due to individual appliance events.

Early History of NILM

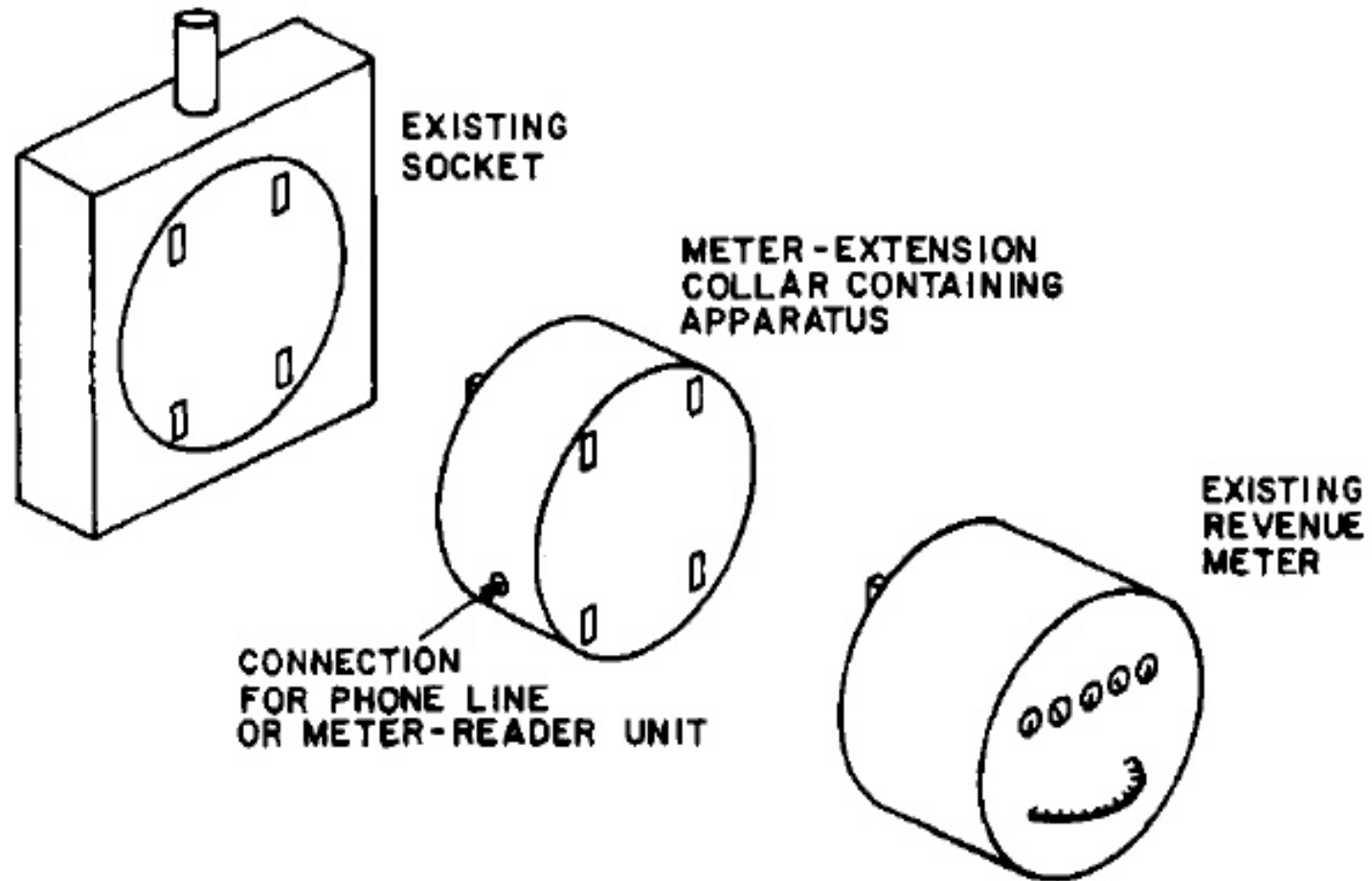
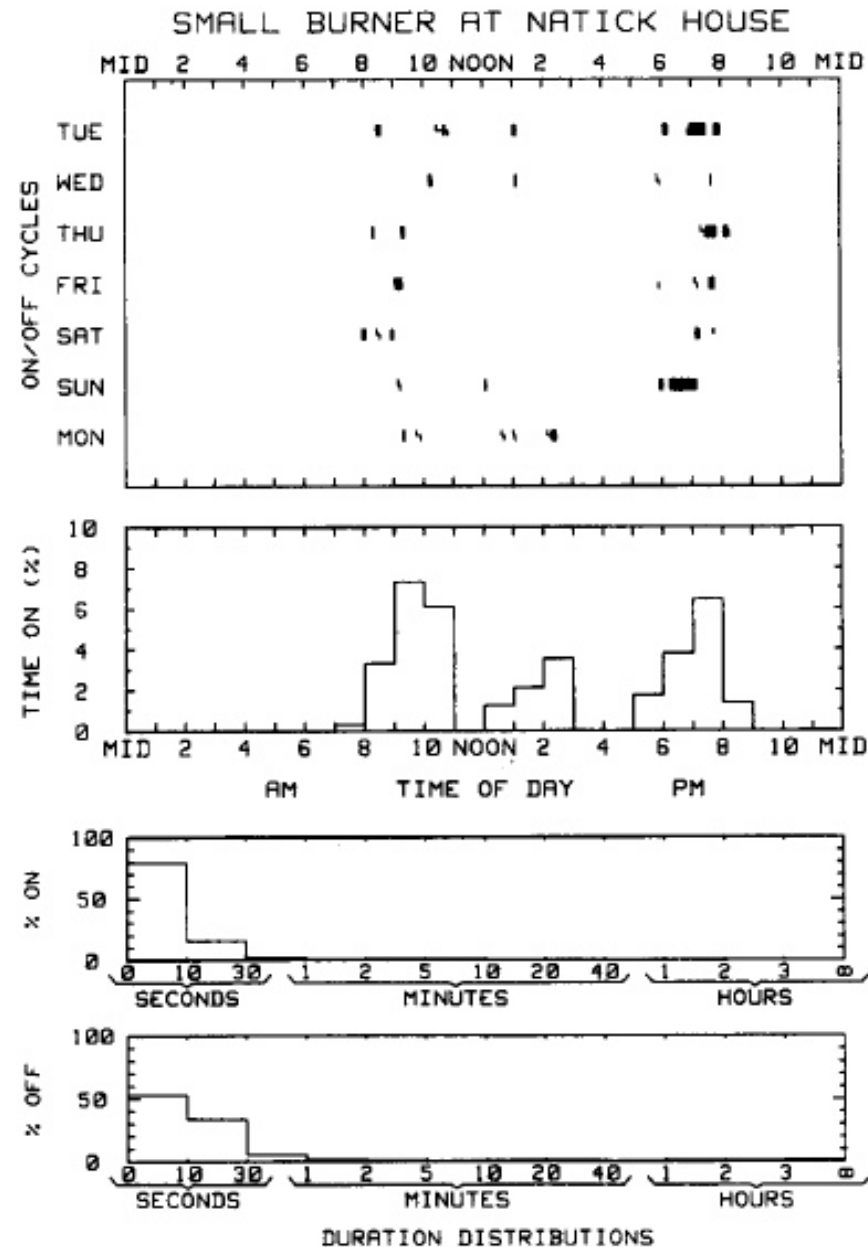
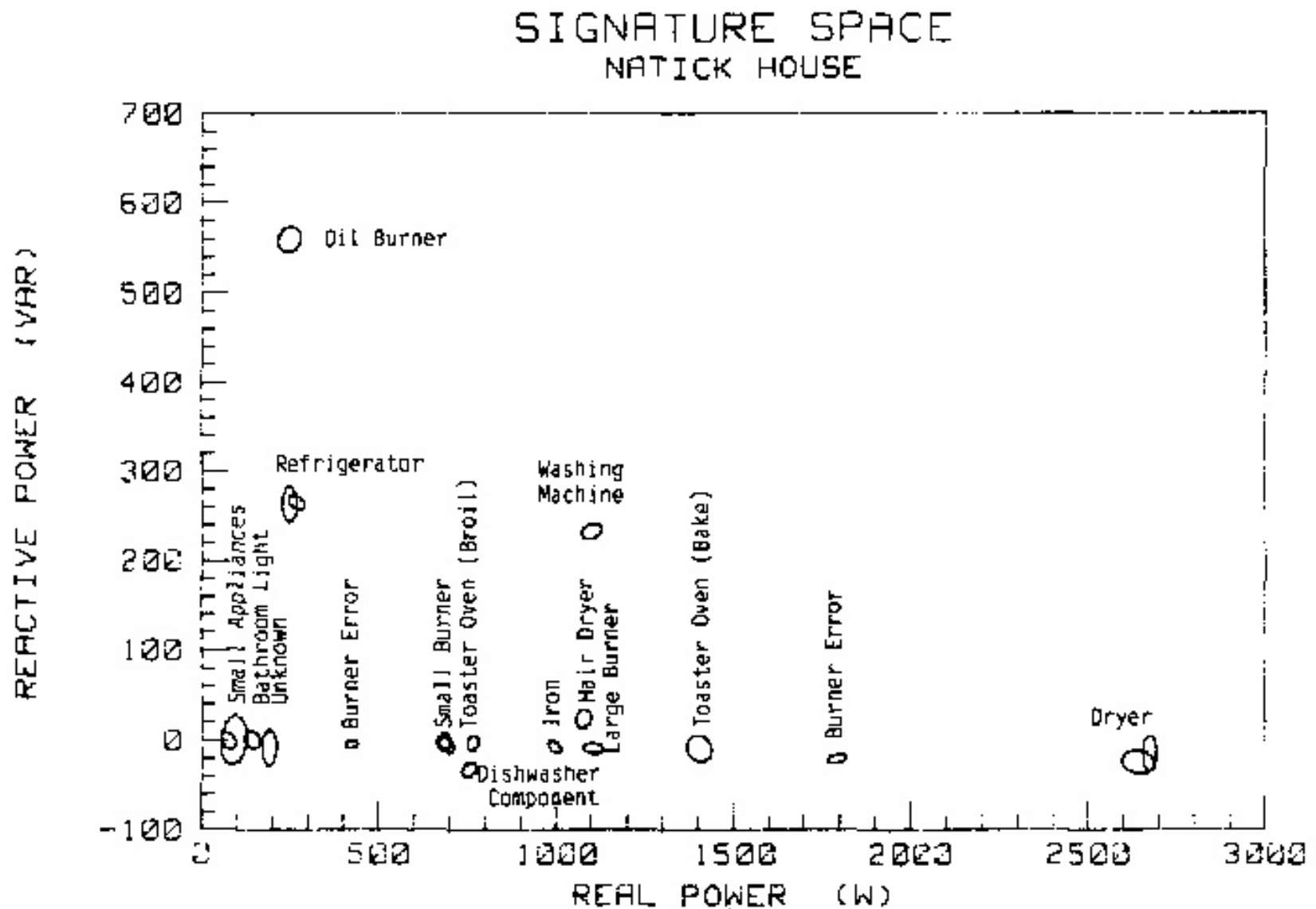


Fig. 1. Collar mounted nonintrusive appliance load monitor.

Early History of NILM



Early History of NILM



Early History of NILM

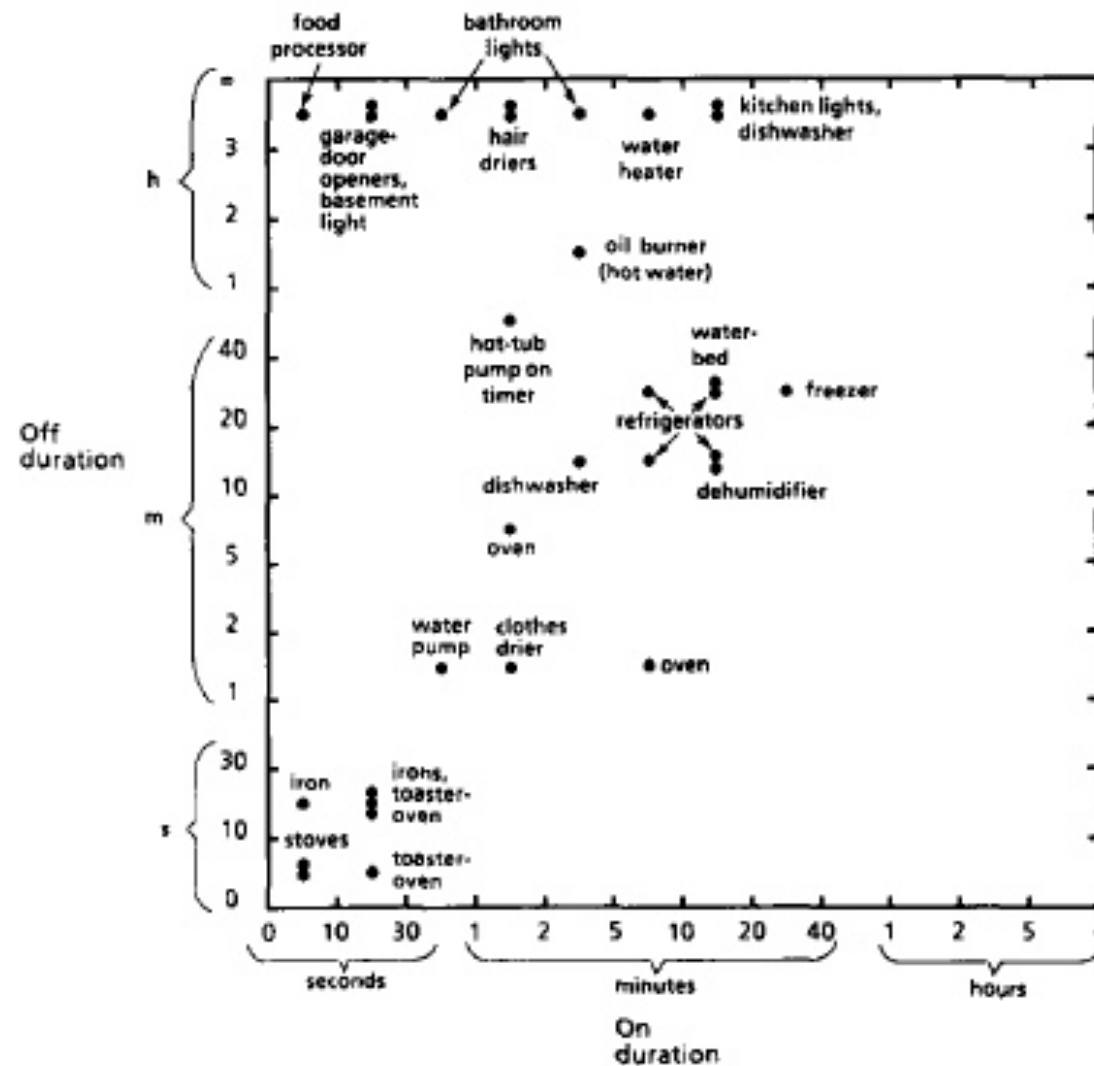
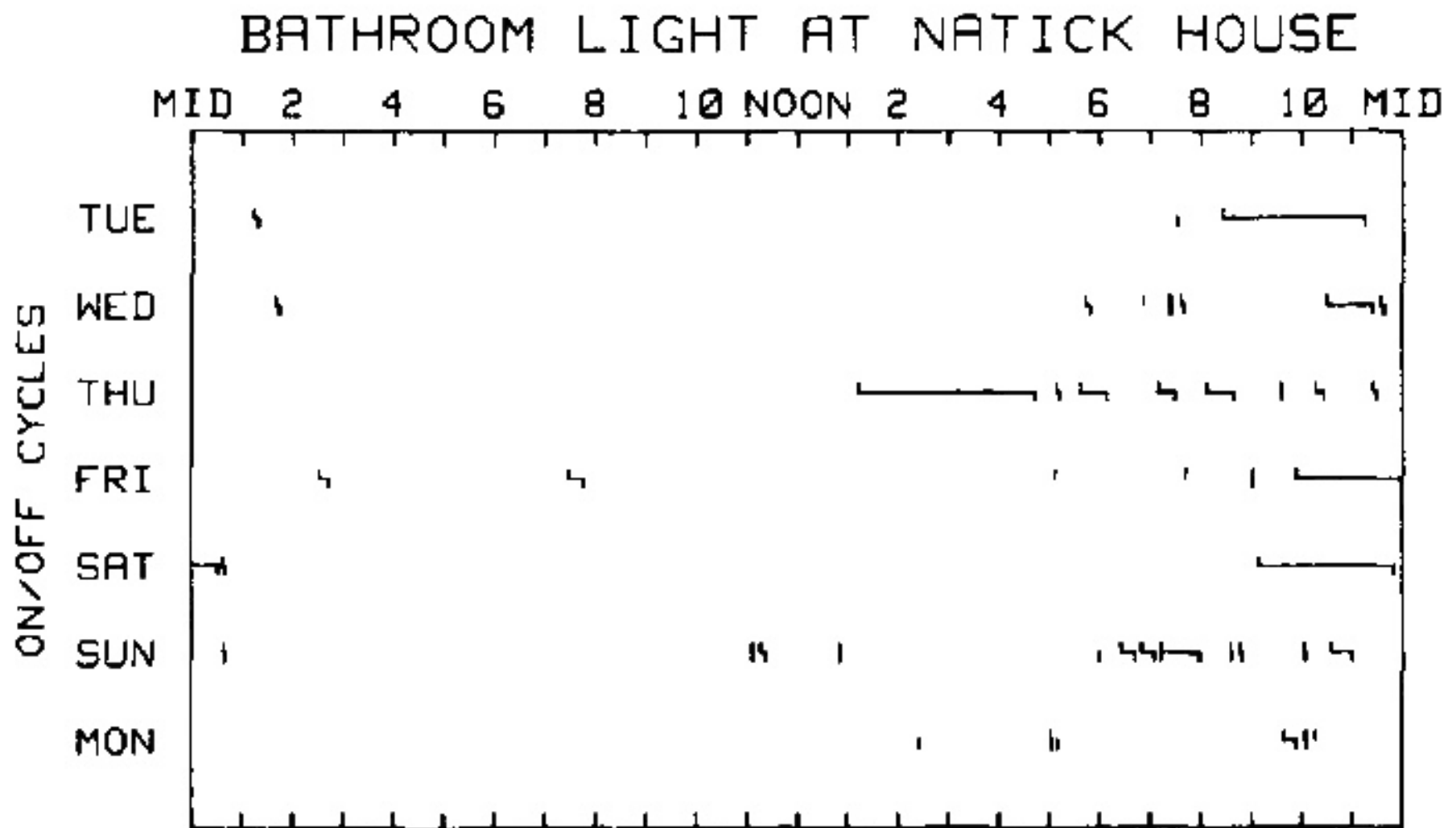


Fig. 10. Typical ON and OFF periods for monitored appliances.

Early History of NILM



Early History of NILM

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Socially camouflaged technologies: the case of the electromechanical vibrator



R. Maines

Publication Year: 1989, Page(s):3 - 11

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Residential energy monitoring and computerized surveillance via utility power flows



G. W. Hart

Publication Year: 1989, Page(s):12 - 16

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Early History of NILM

Nonintrusive Appliance Load Monitor Published References

The following publications comprise a fairly complete bibliography concerning the [NALM](#), up to 1995, compiled by [George W. Hart](#). I am no longer maintaining it.


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- Hart, G.W., "Nonintrusive Appliance Load Monitoring," *Proceedings of the IEEE*, December 1992, pp. 1870-1891.
- Hart, G.W., *Nonintrusive Appliance Load Monitoring with Finite-State Appliance Models*, Technical Report submitted to EPRI, January, 1992. Includes as its three chapters the drafts of Hart, 1992, Hart and Wang, 1992, and Hart and Bouloutas 1993.
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- Hart, G.W., and E. Kern, *Digital AC Monitor*, U.S. Patent #4,672,555.

Early History of NILM



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Prototype nonintrusive appliance load monitor : progress report 2

Author: [George W Hart](#); [Massachusetts Institute of Technology. Energy Laboratory](#); [Electric Power Research Institute](#).

Publisher: Concord, Mass. : MIT Energy Laboratory, 1985.


Edition/Format:  Print book : English

Database: WorldCat

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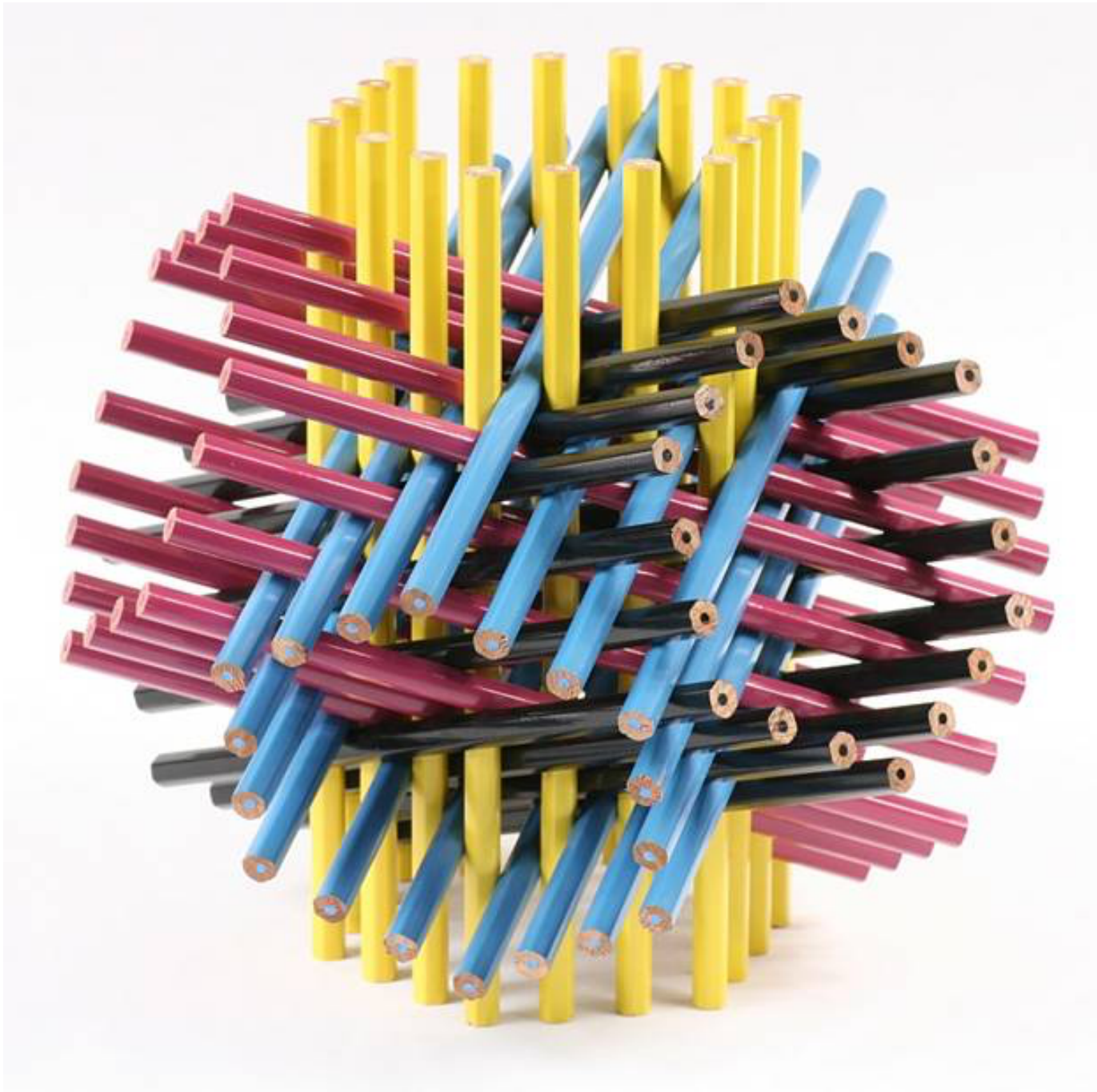
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72 Pencils – CMYK



Roads Untaken



Loopy



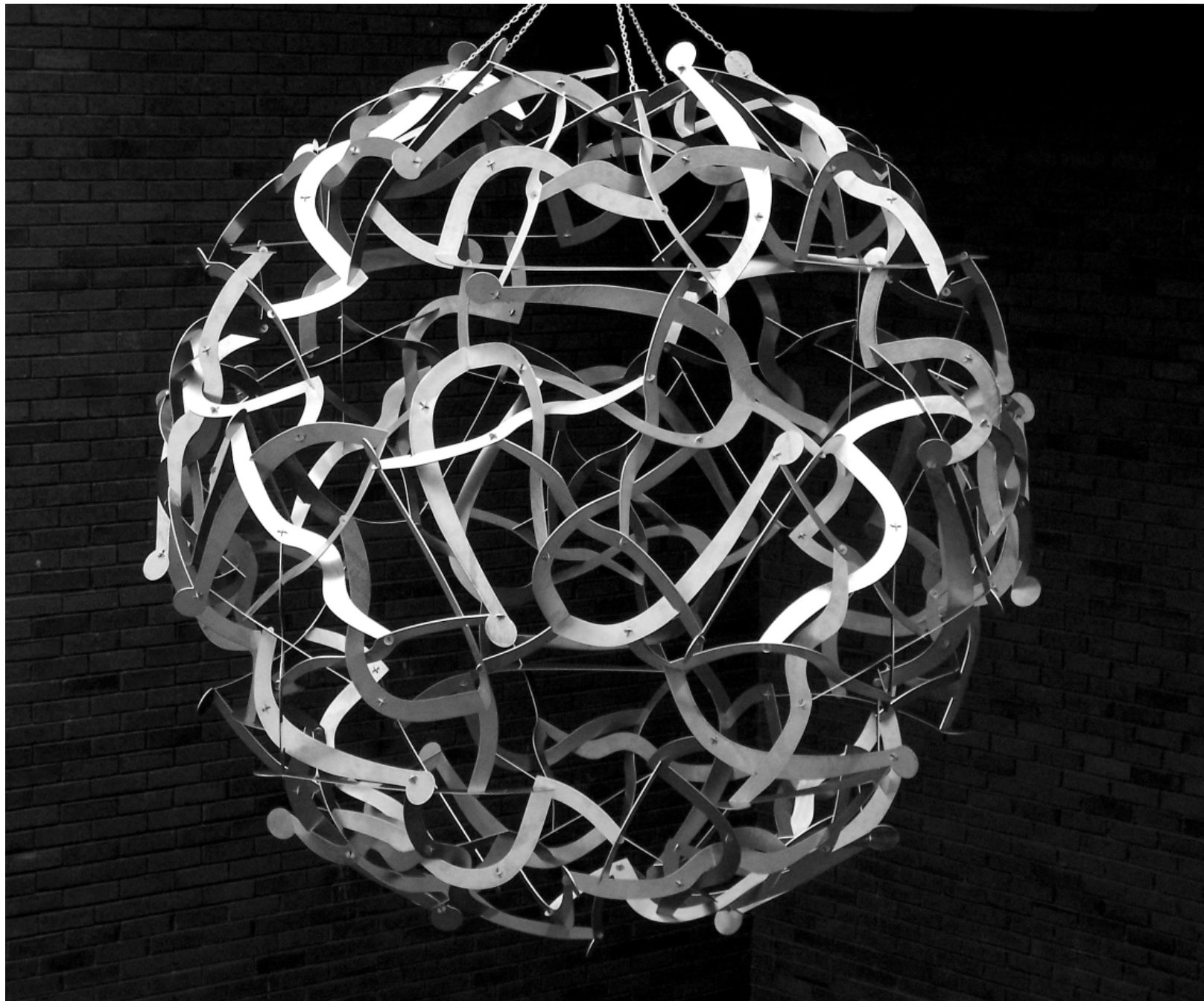
Frabjous



Solar Flair



Spaghetti Code



Macalester College



Rainbow Bits



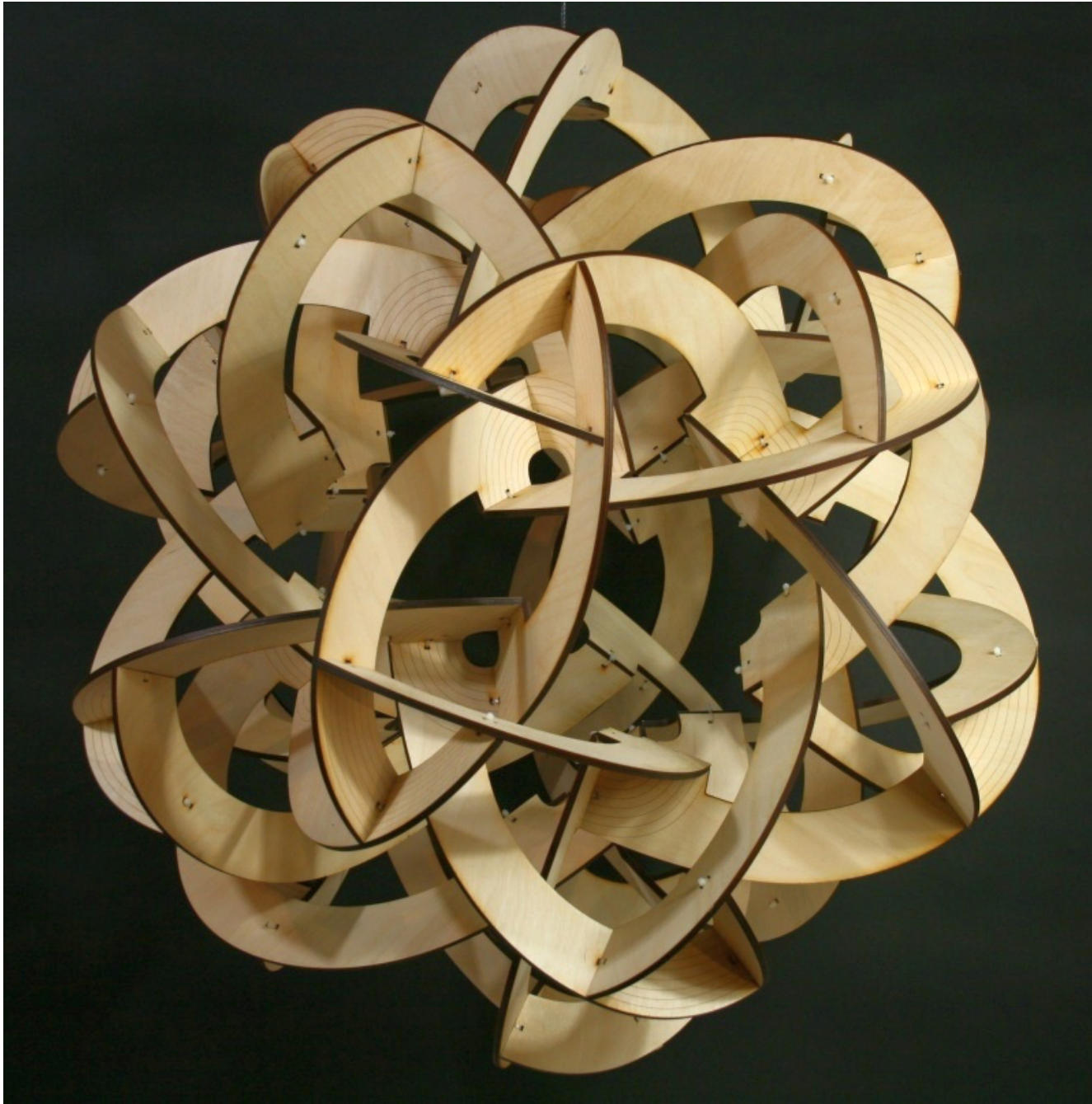
Salamanders



Geometry Ascending a Staircase



Celebration of Mind – Princeton



Aalto



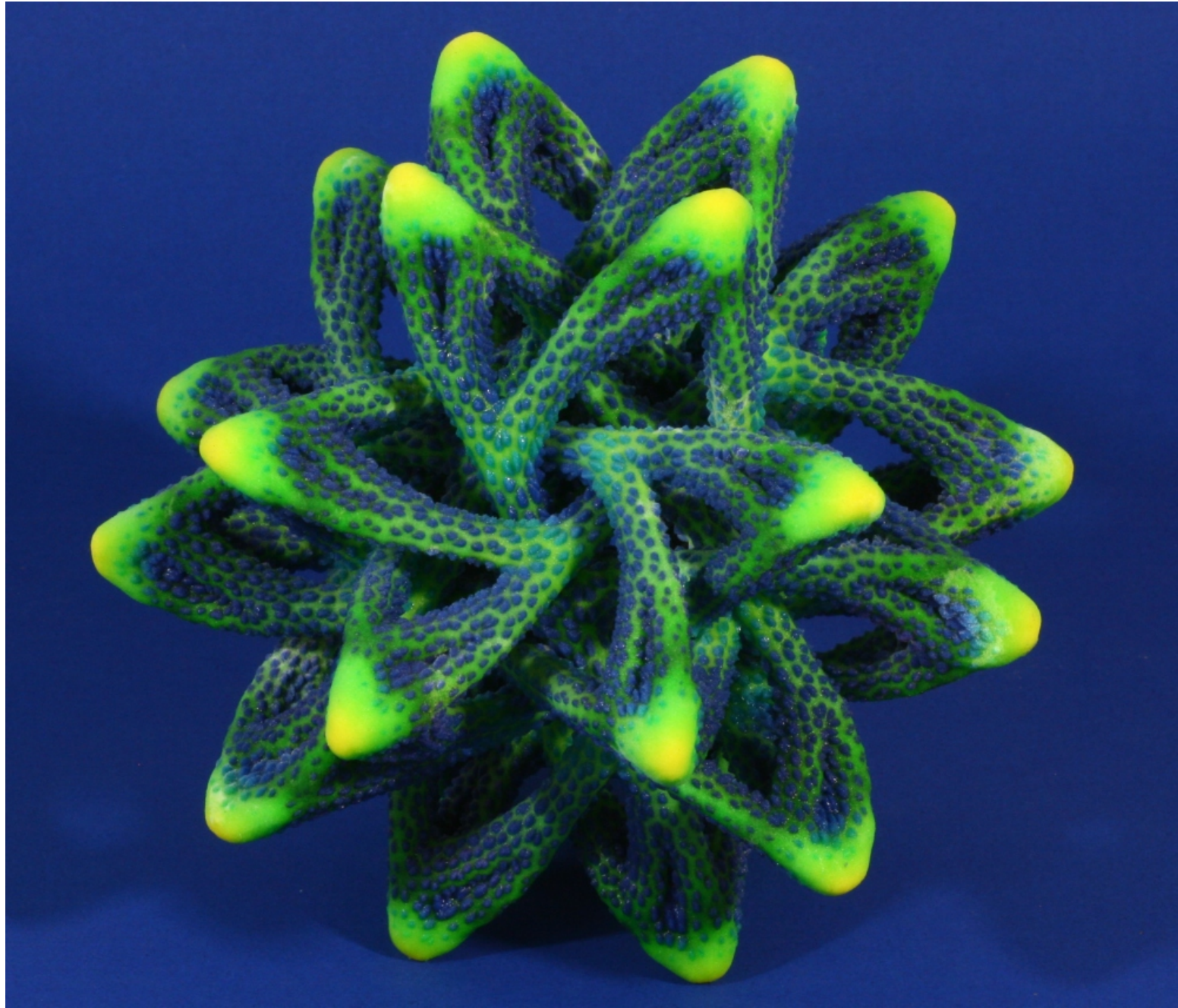
3D Printed Designs



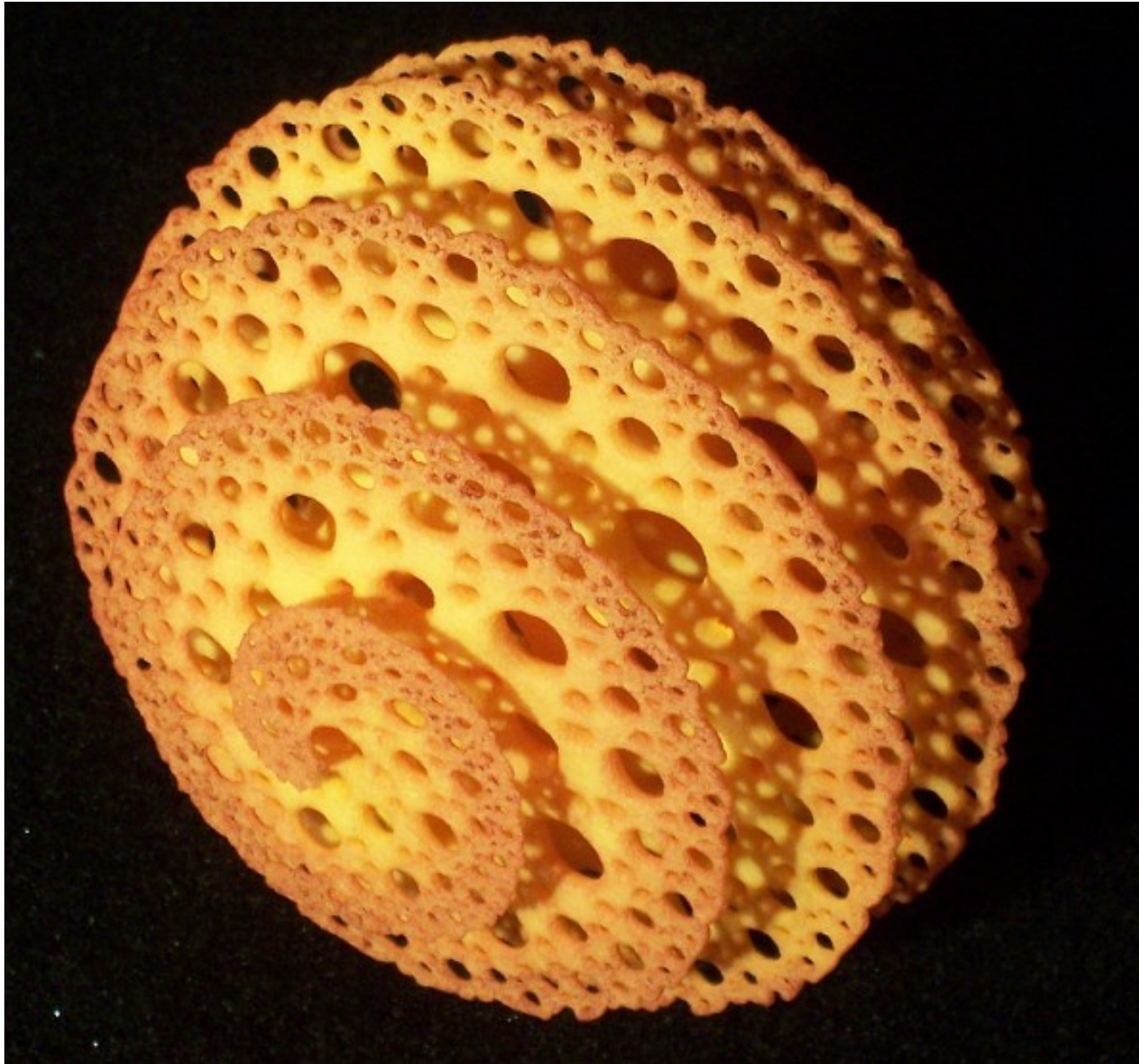
3D Printed Designs



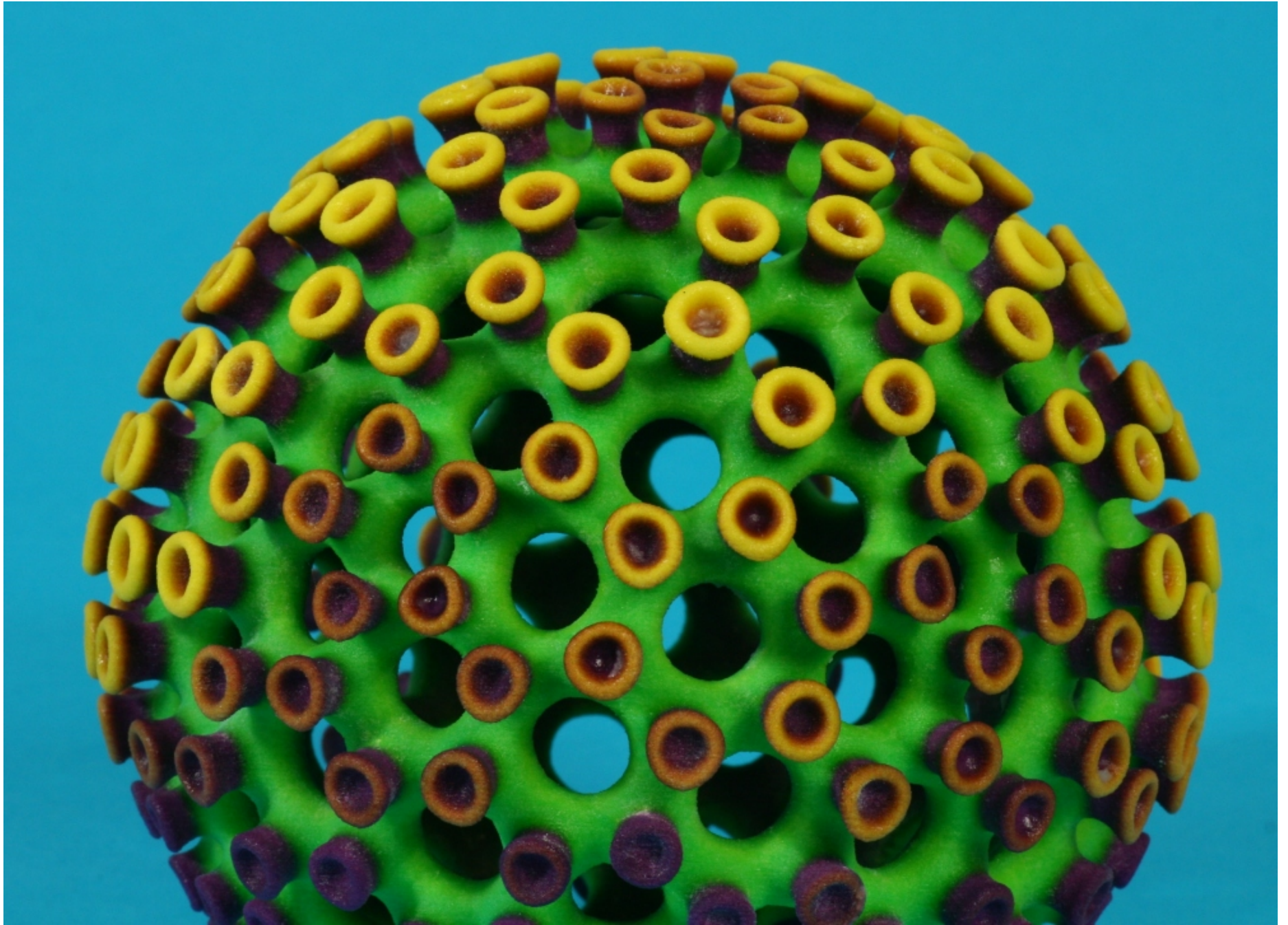
Thorny Dragonflies



Echinodermata



Blorb

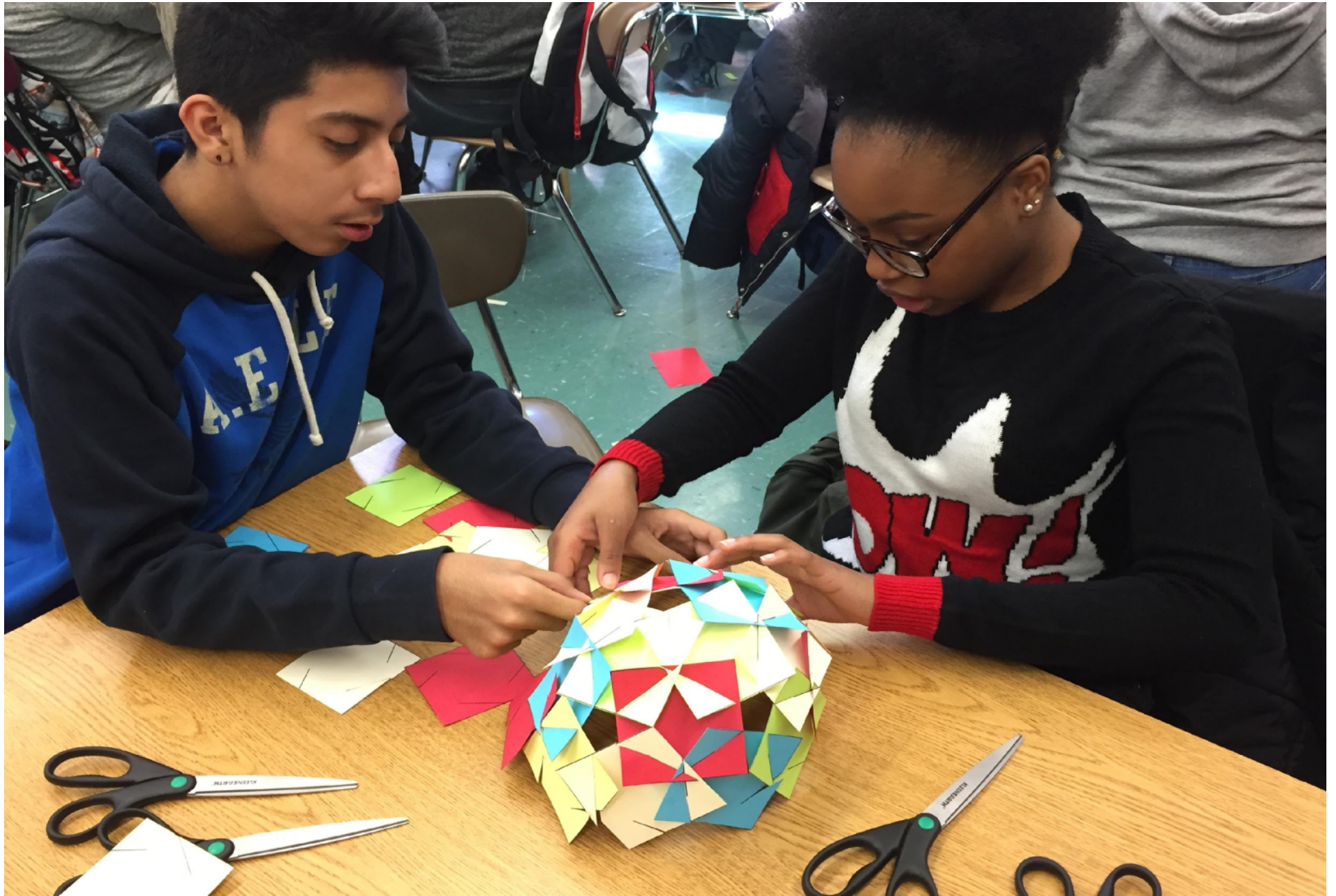


Workshop Activities

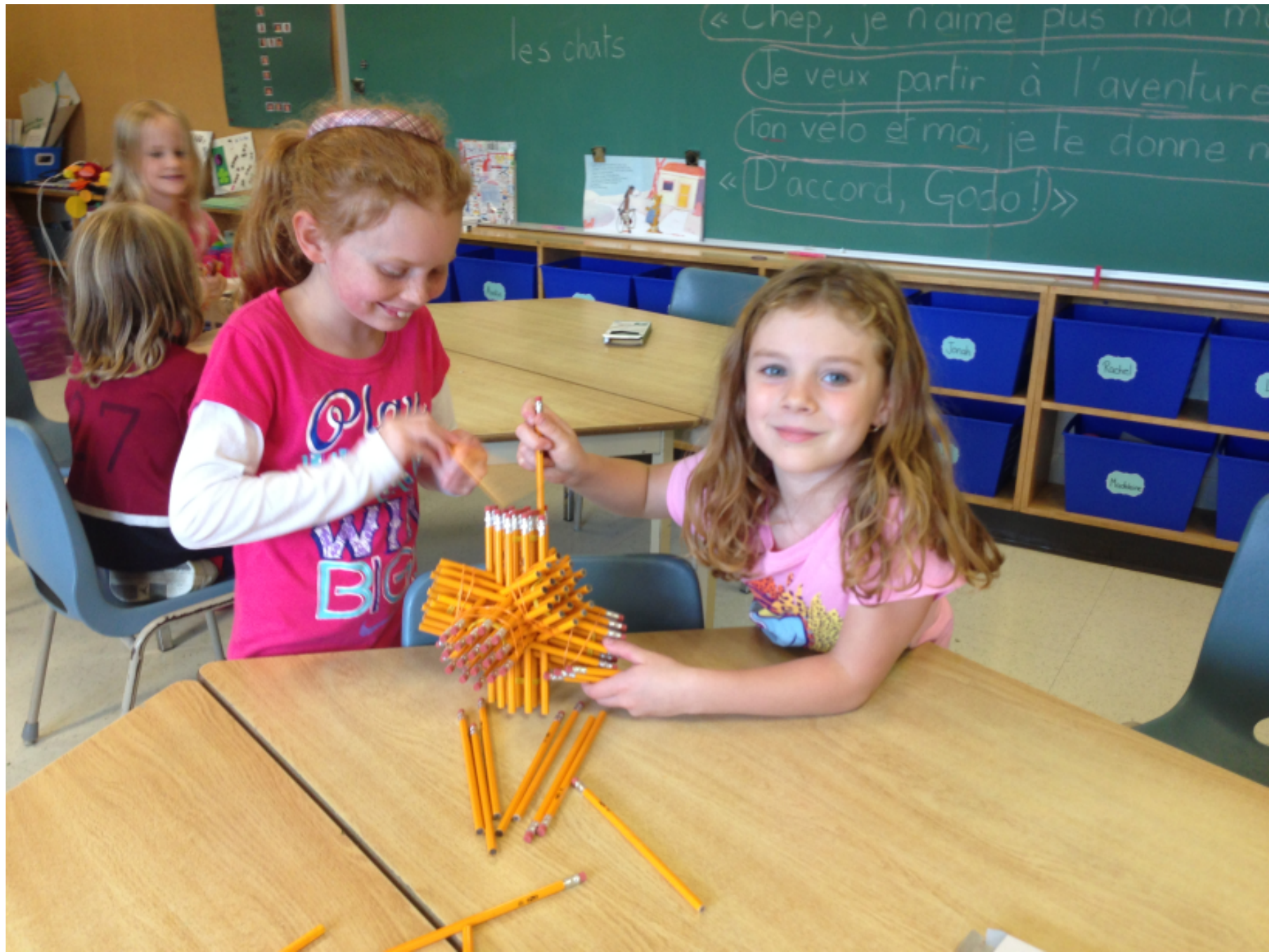
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with Elisabeth Heathfield

Paper Puzzle Constructions



Pencil Construction



CDs



Skewer Hyperboloid



Chop-Sticks Hyperboloid



Domes



Domes



Paper Catenary Arch



Cardboard Catenary Arch



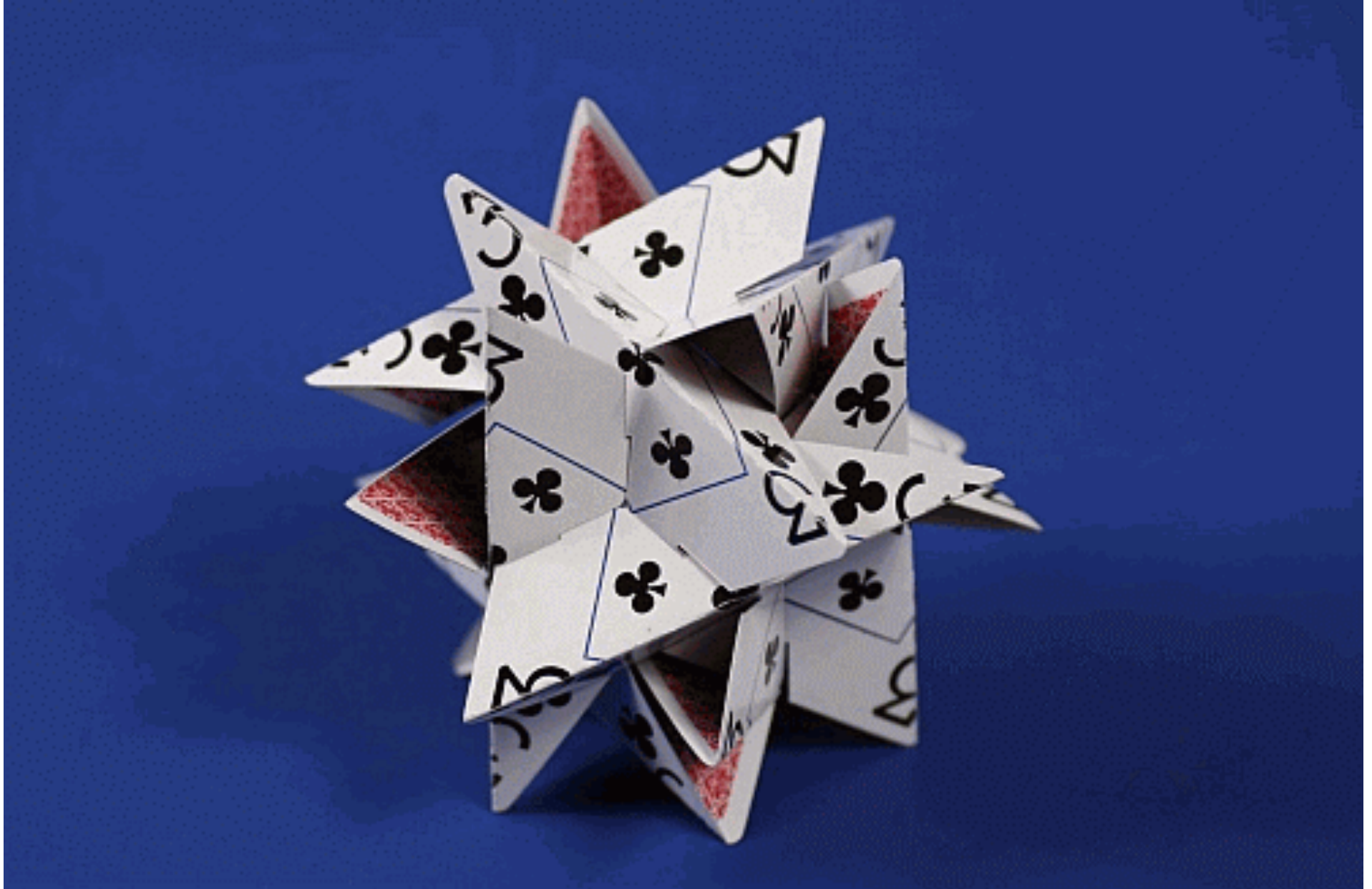
Playing Card Constructions



Card Construction



12-Card Star Puzzle/Sculpture



Cardboard Constructions



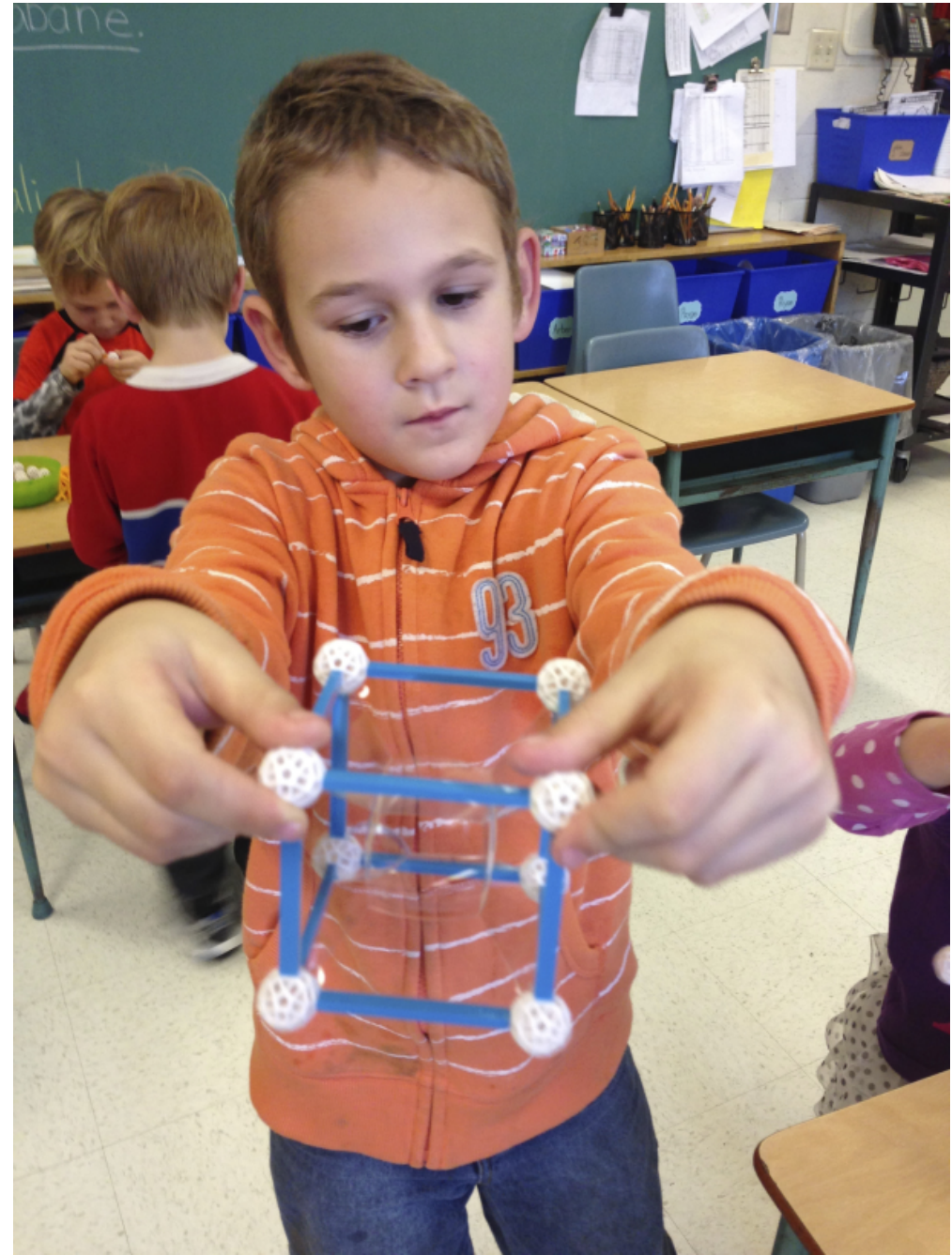
Giant SOMA Puzzle



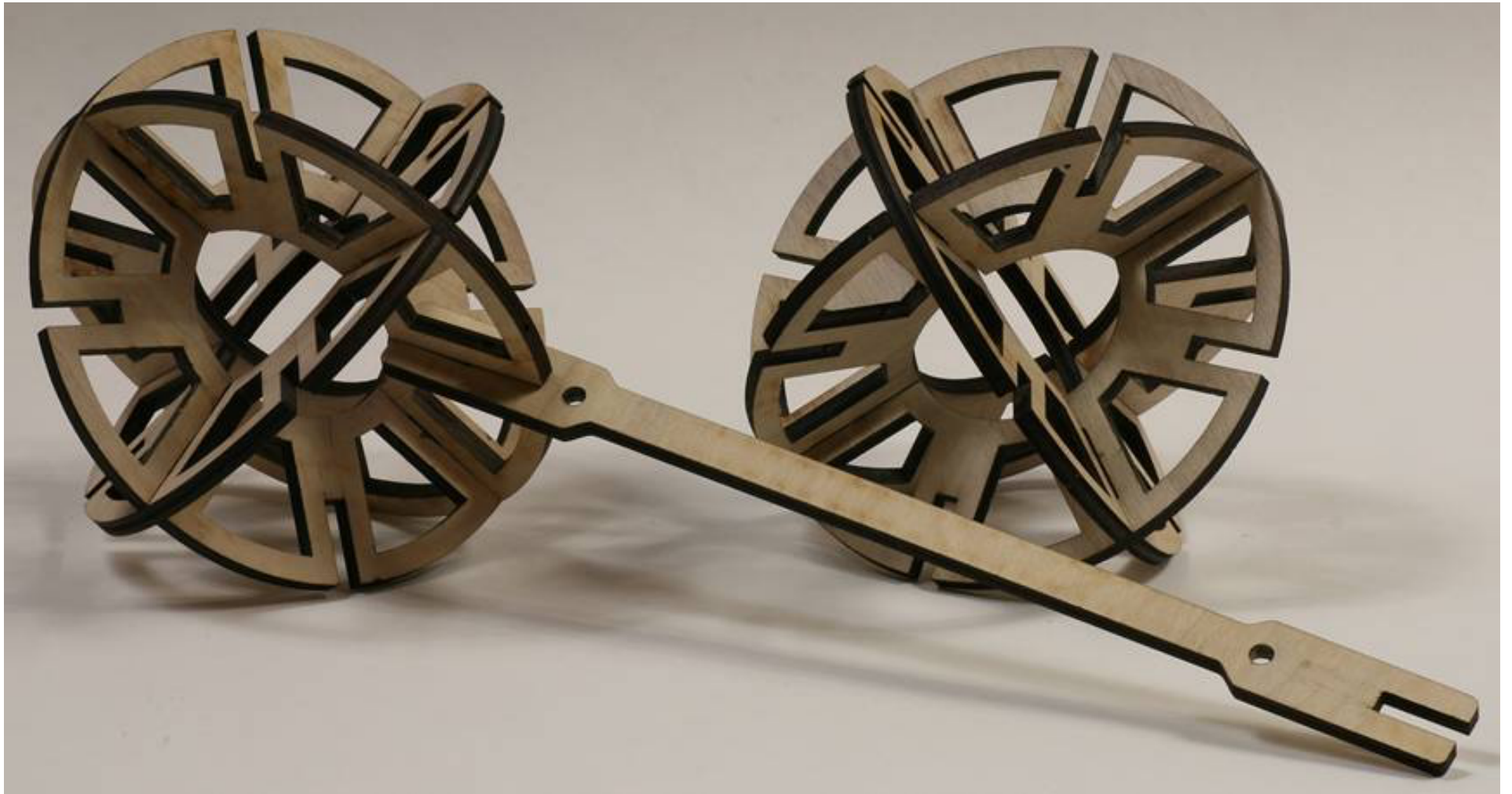
Giant SOMA Puzzle



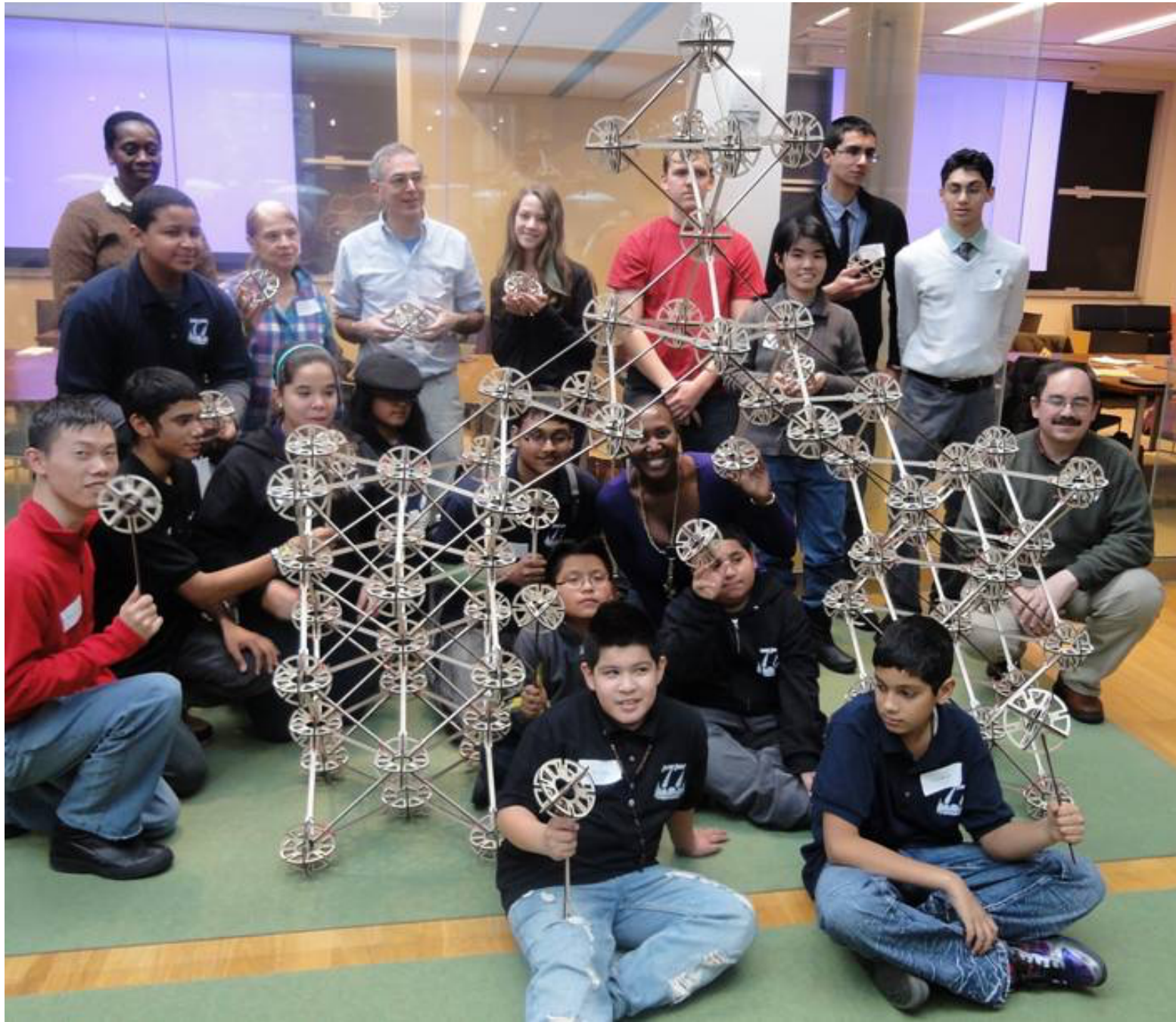
Cubical Soap Bubbles



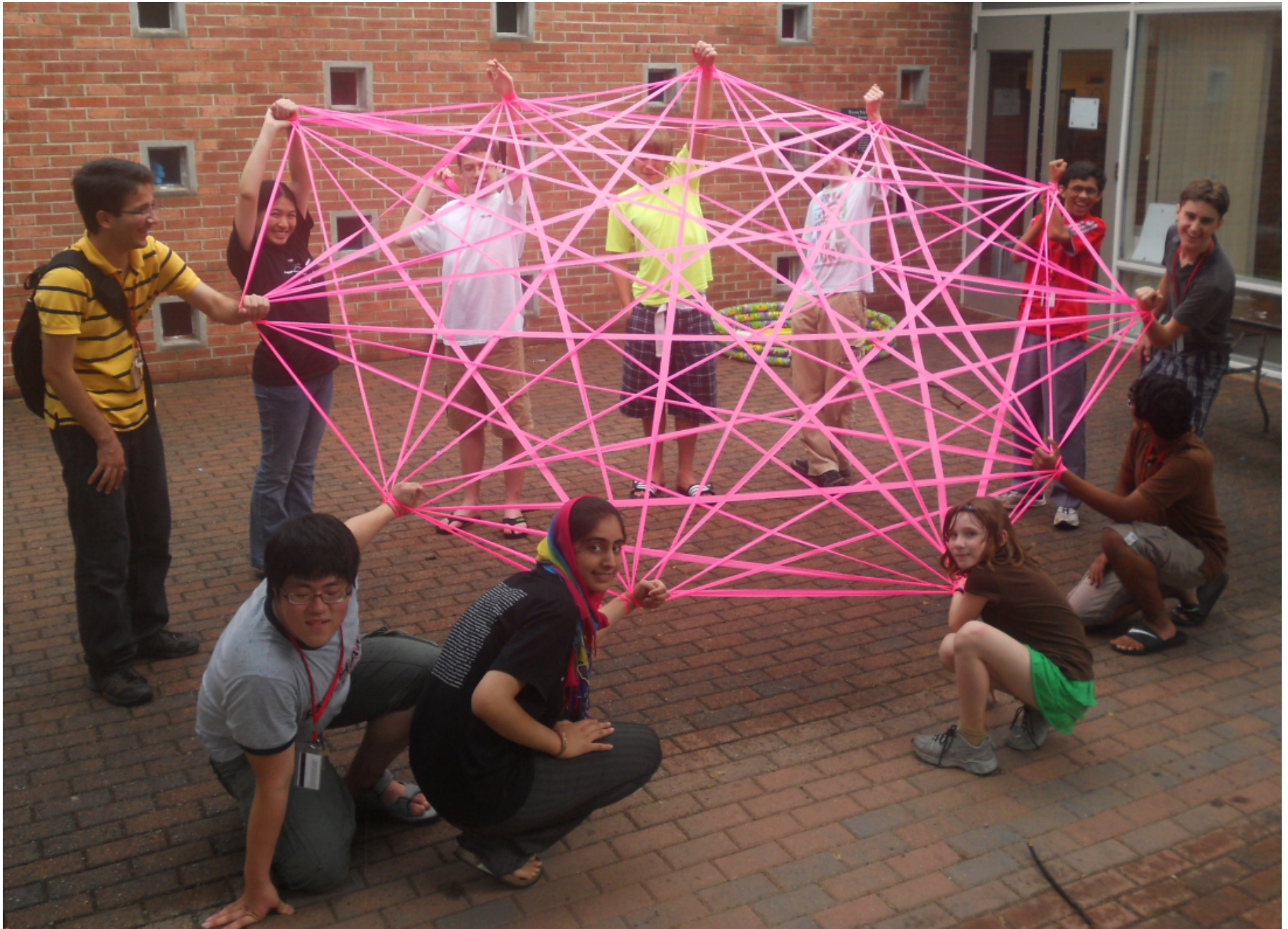
Laser-Cut Plywood Kit



FCC Construction Kit



Complete Graph



Cardboard Sculpture



Light Sticks



Paper Constructions



Paper Constructions



Polytope Construction – Central Park



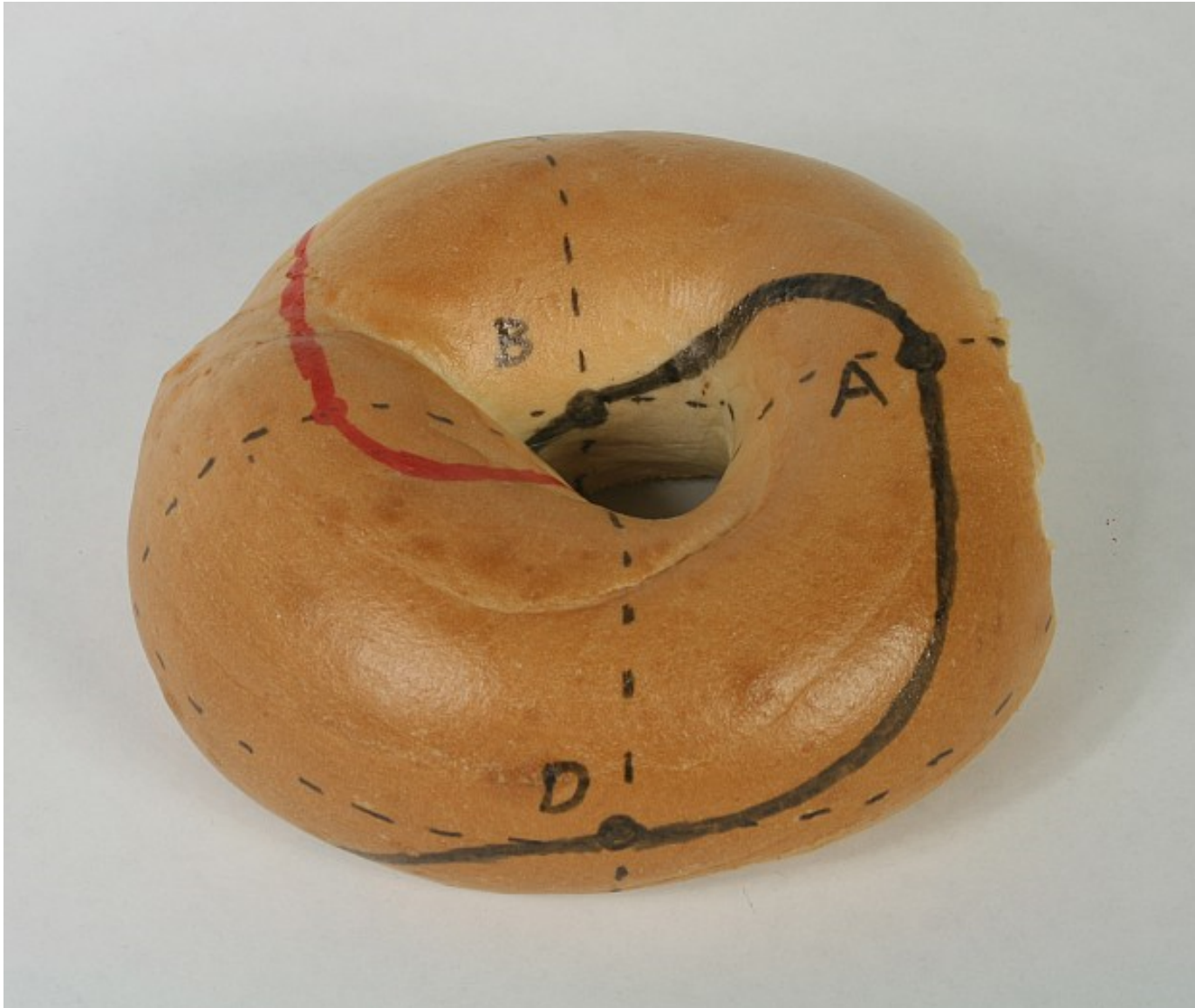


Venice
March, 2006

Giant ZomeTool Polytopes



Linked Bagel Halves



Linked Bagel Halves



Linked Bagel Halves



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Focus on your passion !



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