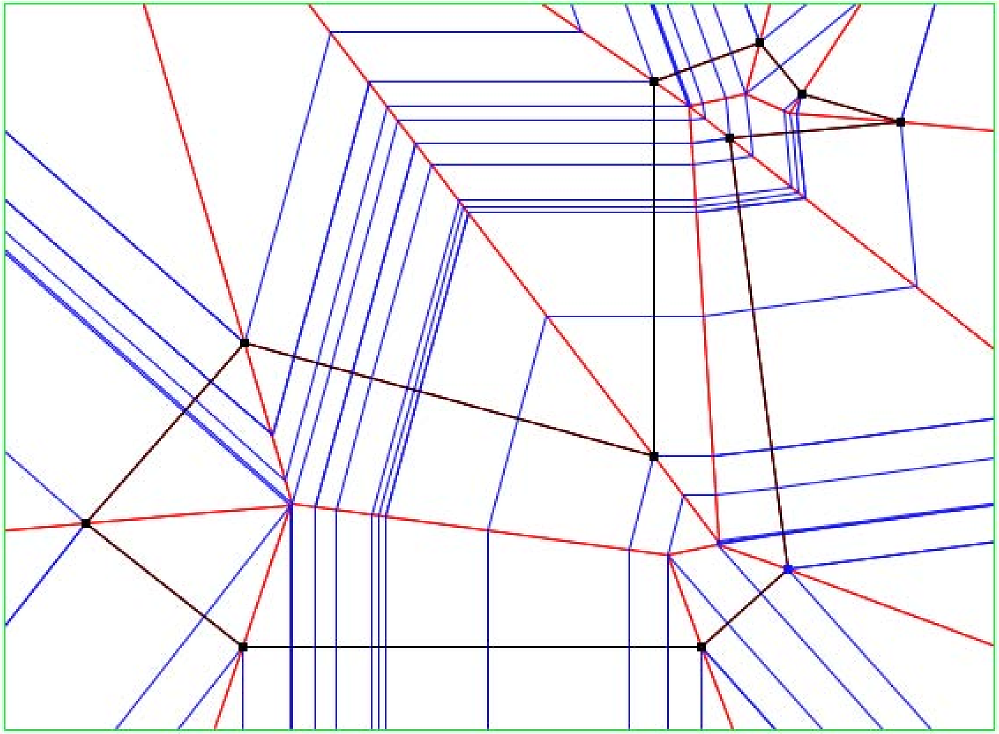
Is there still no software for the fold-and-cut problem? I was totally expecting you to pull out some cool app for it.



Courtesy of David Benjamin and Anthony Lee. Used with permission.

David Benjamin & Anthony Lee
2010

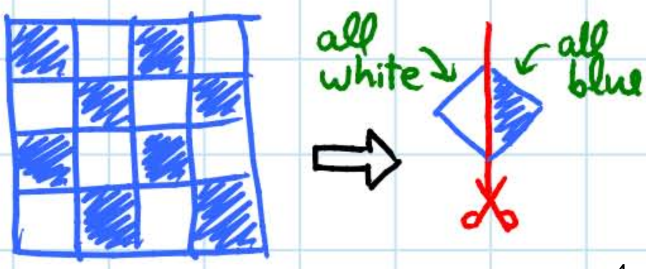
Crease pattern for "The big fish: step by step" removed due to copyright restrictions.

For the universality condition, don’t you need some condition like that every vertex not on the edge of the paper has even degree? Or can the cut be a line segment instead of a whole line?

Side assignment: specify which cut regions are <u>above</u> or <u>below</u> the cut line

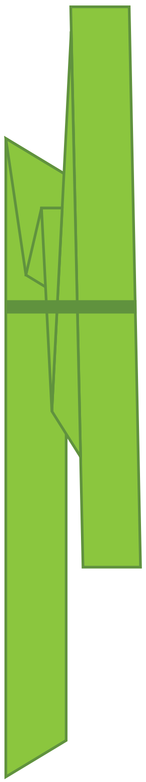
- skeleton edges as above in above regions; reversed in below regions
- cut edge <u>valley</u> between two above regions
  <u>mountain</u> between two below regions
  <u>uncreased</u> between one above & one below

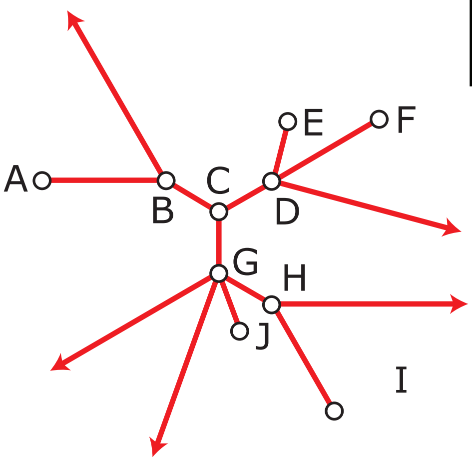
- e.g. 2-regular (nested/disjoint polygons)
  ⇒ natural 2-coloring
  ⇒ all cuts uncreased ("<u>scissor cuts</u>")
- e.g. 4-regular checkerboard



Could you quickly show the process of turning linear corridors into a tree?

I am confused about the correspondence between trees and corridors and their relation to being flat foldable.





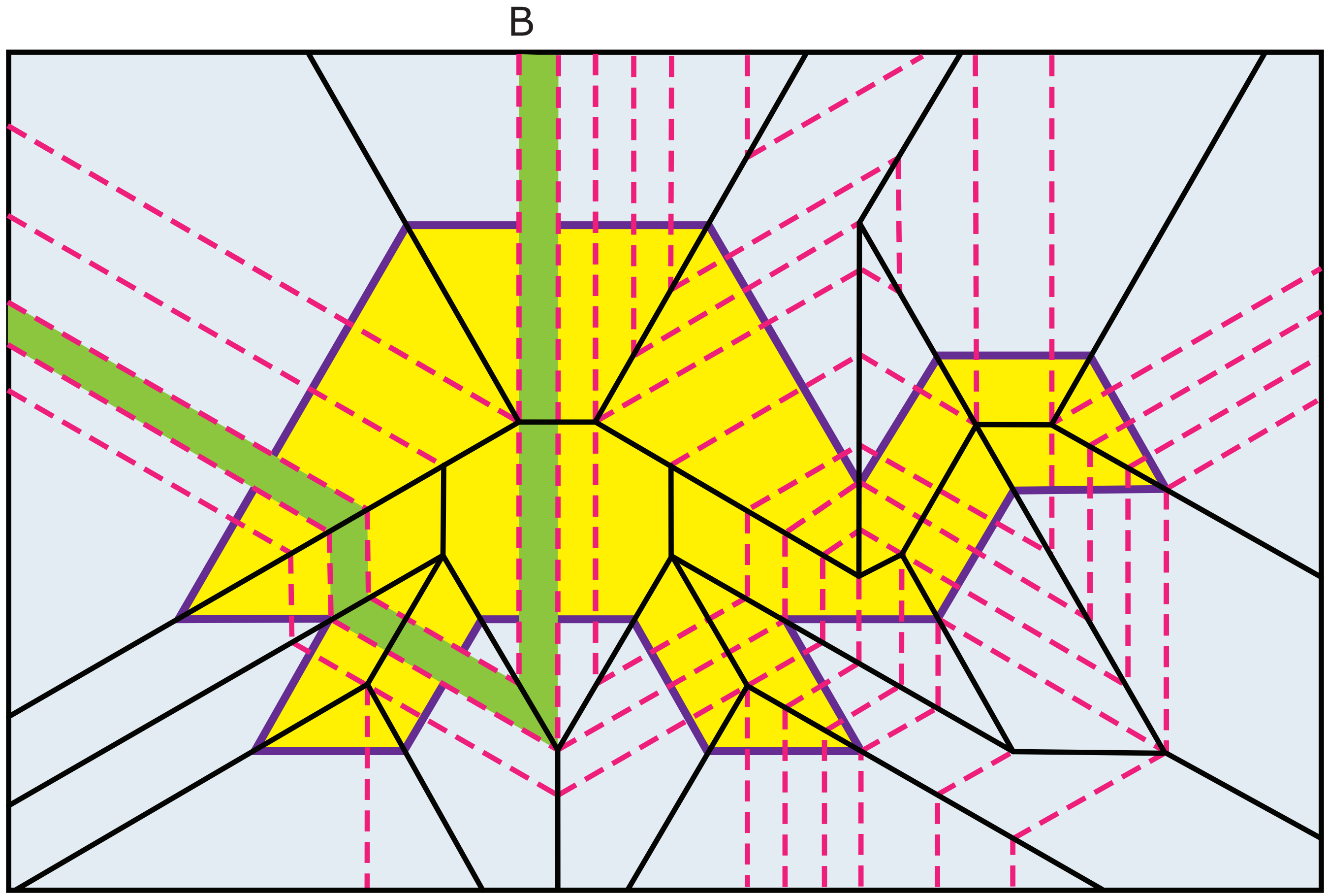
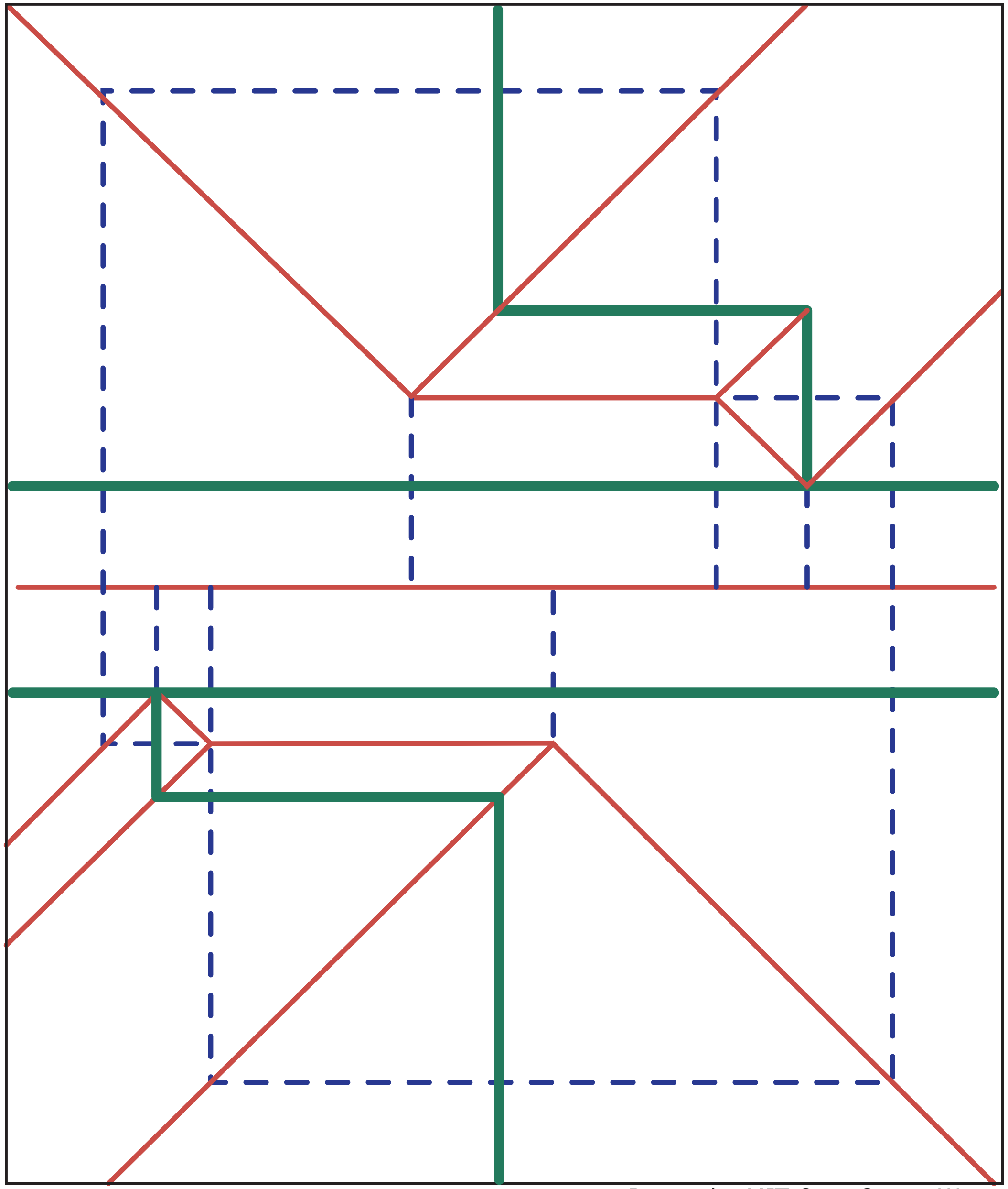
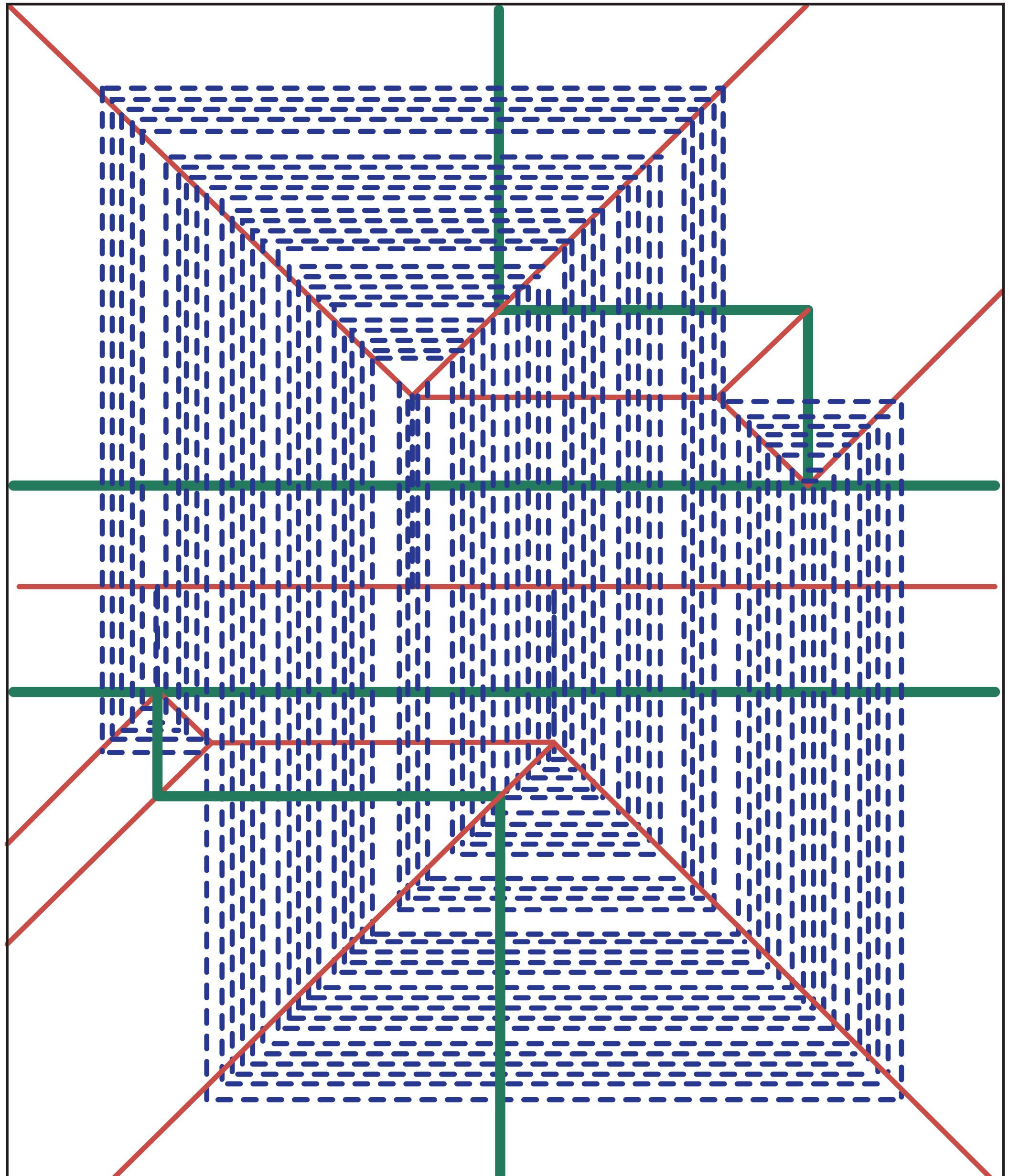


Image by MIT OpenCourseWare.

On the probability of bad straight skeletons, I was wondering it if should be the other way around — [...] most randomly generated fold-cut problems will exhibit this chaotic straight skeleton, since the number of irrational numbers in any interval is more than the number of rational numbers?





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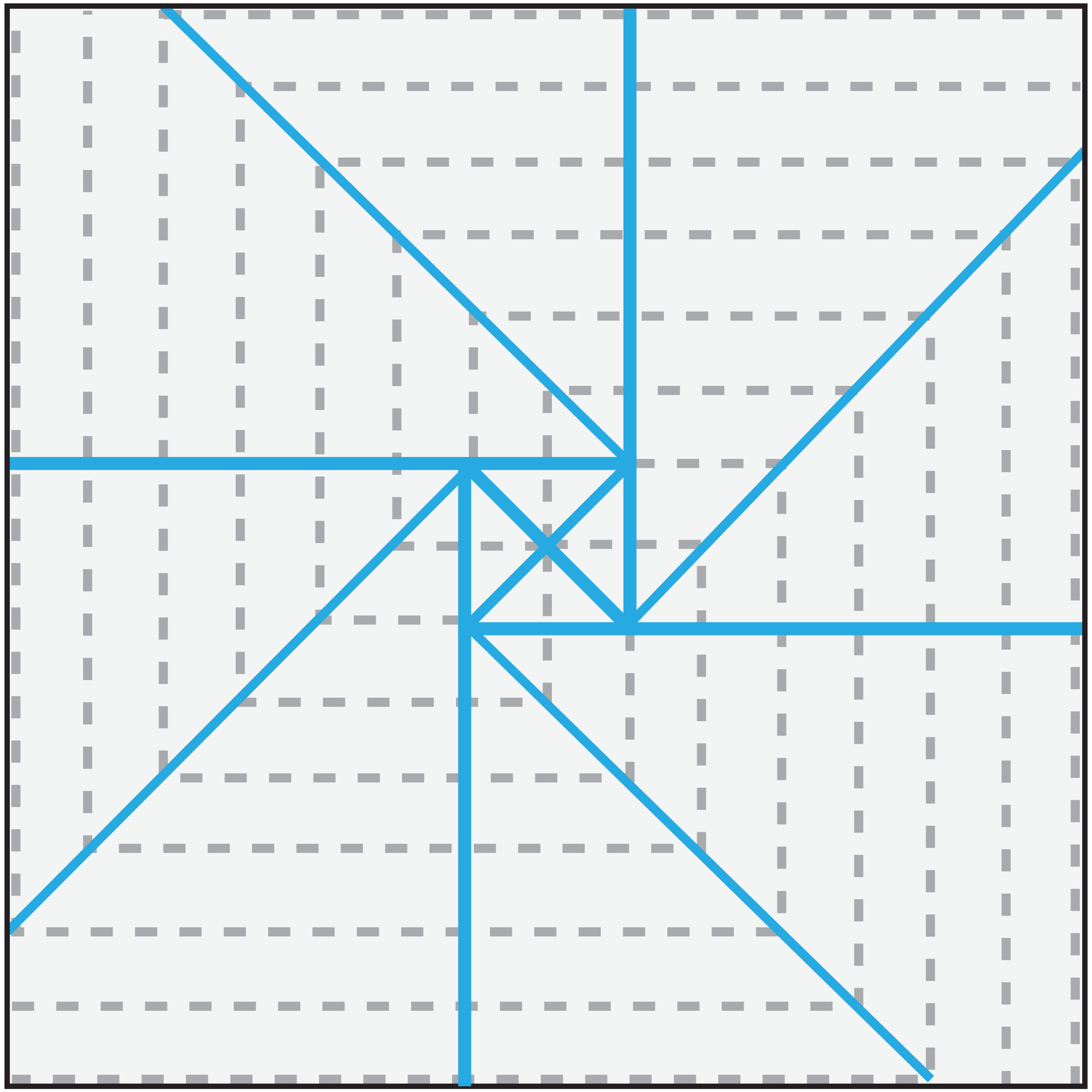

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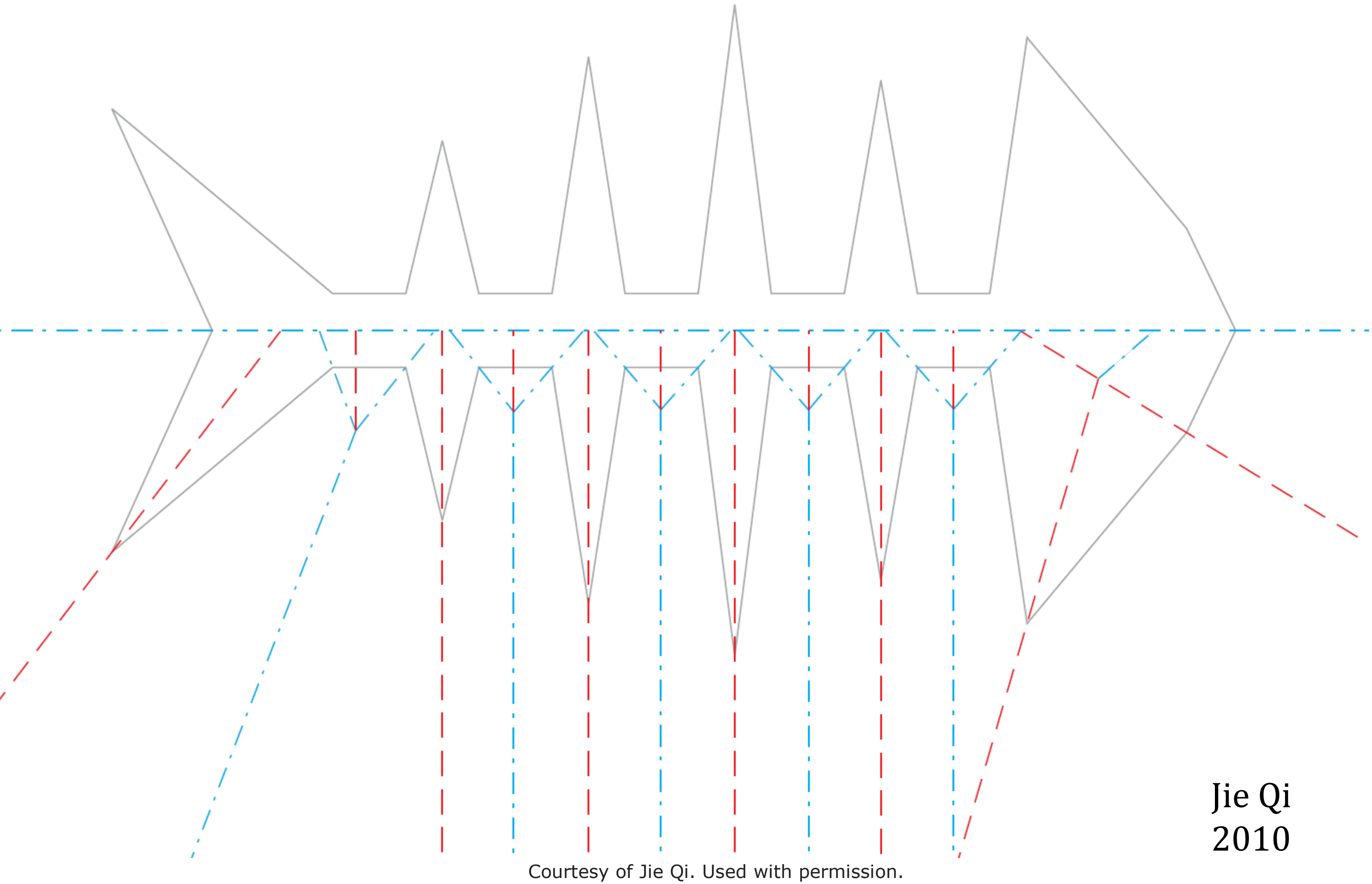
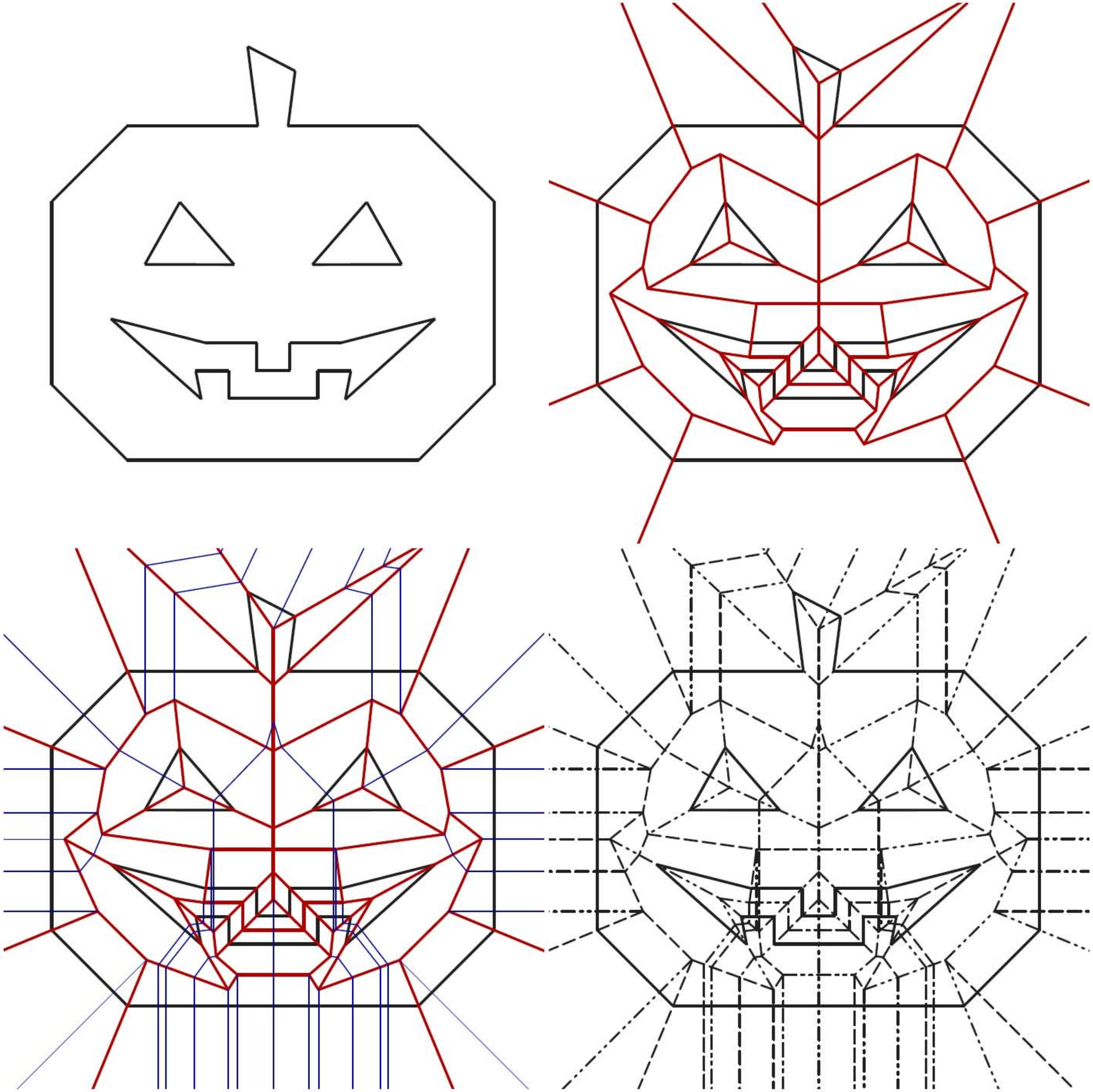


Jie Qi
2010

Crease pattern of witch hat removed due to copyright restrictions.

Sarah Eisenstat
2010



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Jason Ku
2010

Diagram of fold instruction and final figure removed due to copyright restrictions.
Refer to: Fig. 6 from Demaine, Erik D., and Martin L. Demaine. "Fold-and-Cut Magic." *Tribute to a Mathemagician*. A K Peters, 2004, pp. 23–30.

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Refer to: Fig. 6 from Demaine, Erik D., and Martin L. Demaine. "Fold-and-Cut Magic." *Tribute to a Mathemagician*. A K Peters, 2004, pp. 23–30.

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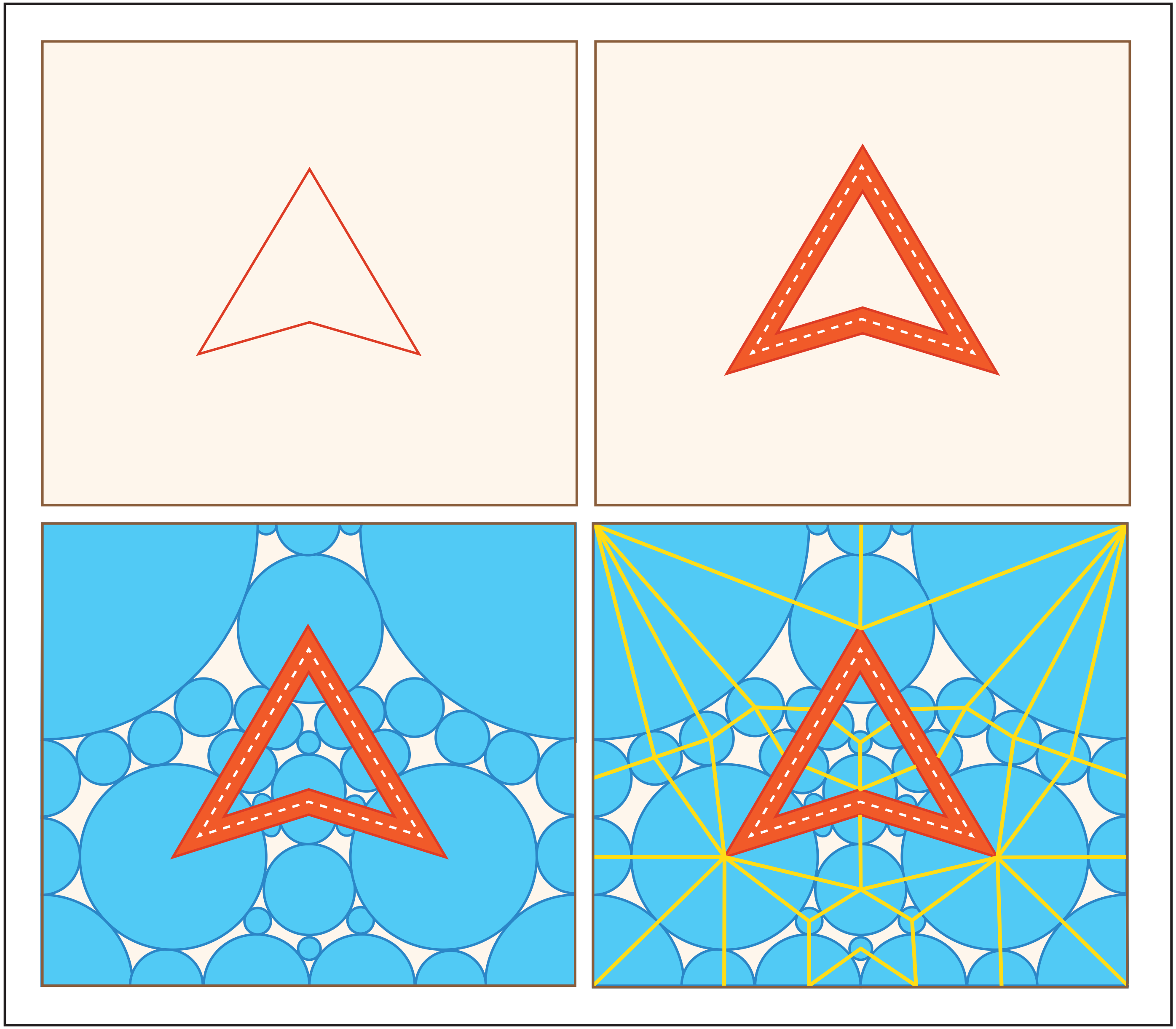
Refer to: Fig. 4 from Demaine, Erik D., and Martin L. Demaine. "Fold-and-Cut Magic." *Tribute to a Mathemagician*. A K Peters, 2004, pp. 23–30.

I got a little confused in the disk-packing method, and specifically how you went from a disk-packing to the diagram with all the triangles. All in all, cool proof though.



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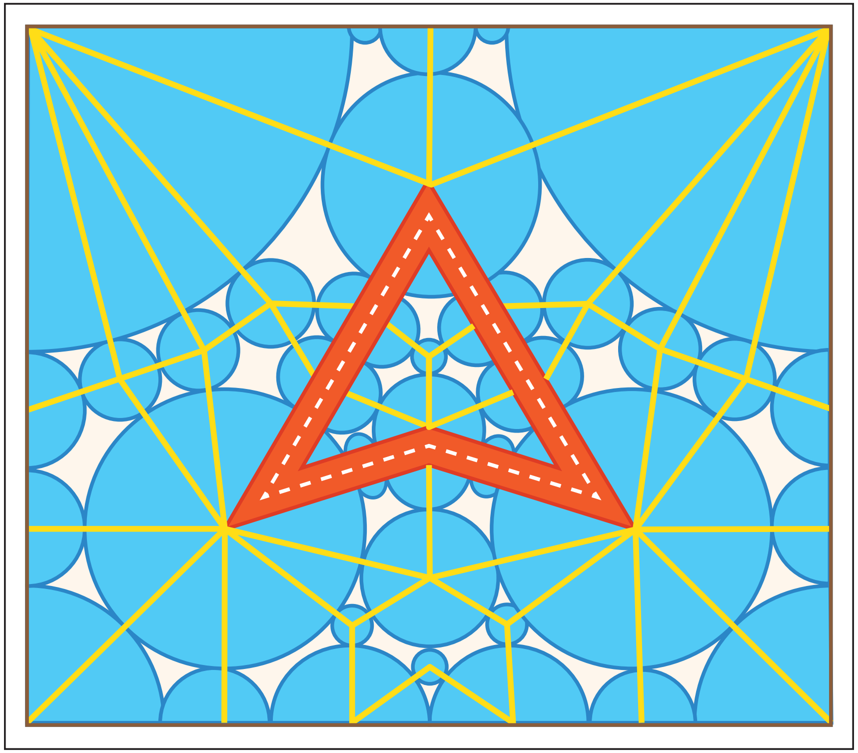
There seem to be many different ways to allocate disks that satisfy the given conditions. Is any allocation good enough to use for a crease pattern? Is there some kind of "optimal" way of disk packing?

How related is the tree method to the methods for this — is it just that rabbit ears and such come up everywhere, or do we actually have some sort of isomorphism (or not-quite-isomorphism) between fold-and-one-cut designs and uniaxial bases?



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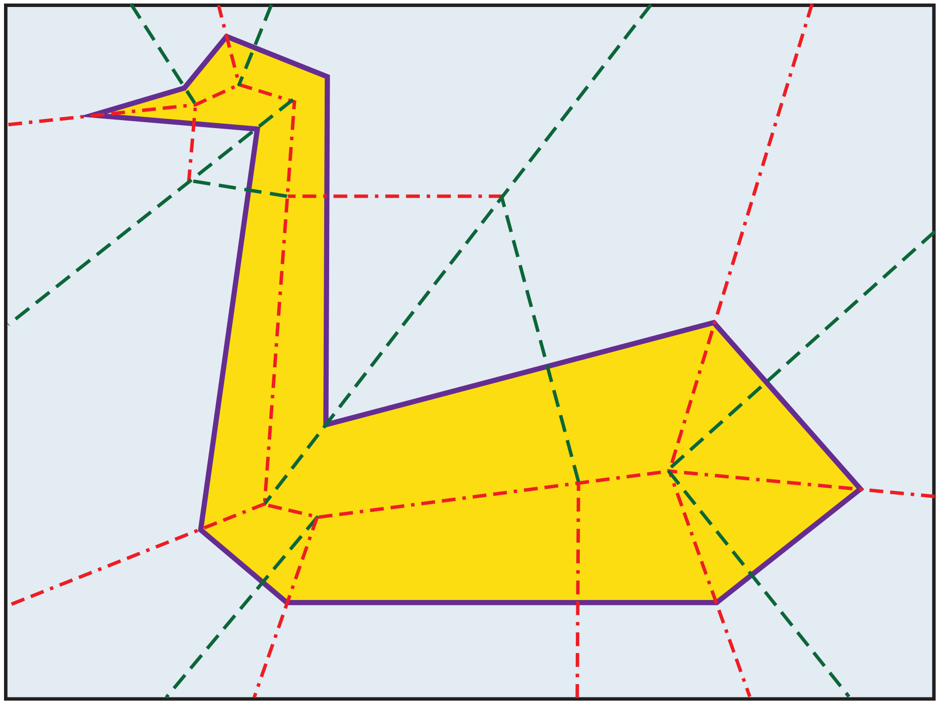
Refer to: Fig. 10.46 from Lang, Robert J. *Origami Design Secrets: MathematicalMethods for an Ancient Art*. 1st ed. A K Peters / CRC Press, 2003.

fold & cut

(disk packing method)

universal molecule

(tree method)



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See also Fold-and-Cut Examples: http://erikdemaine.org/foldcut/examples/.

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Refer to: Fig. 10.46 from Lang, Robert J. *Origami Design Secrets: MathematicalMethods for an Ancient Art*. 1st ed. A K Peters / CRC Press, 2003.

fold & cut
(straight skeleton method)

universal molecule
(tree method)

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Refer to: Lang, Robert J. *Origami Design Secrets: Mathematical Methods for an Ancient Art*. 2nd ed. A K Peters / CRC Press, 2011.

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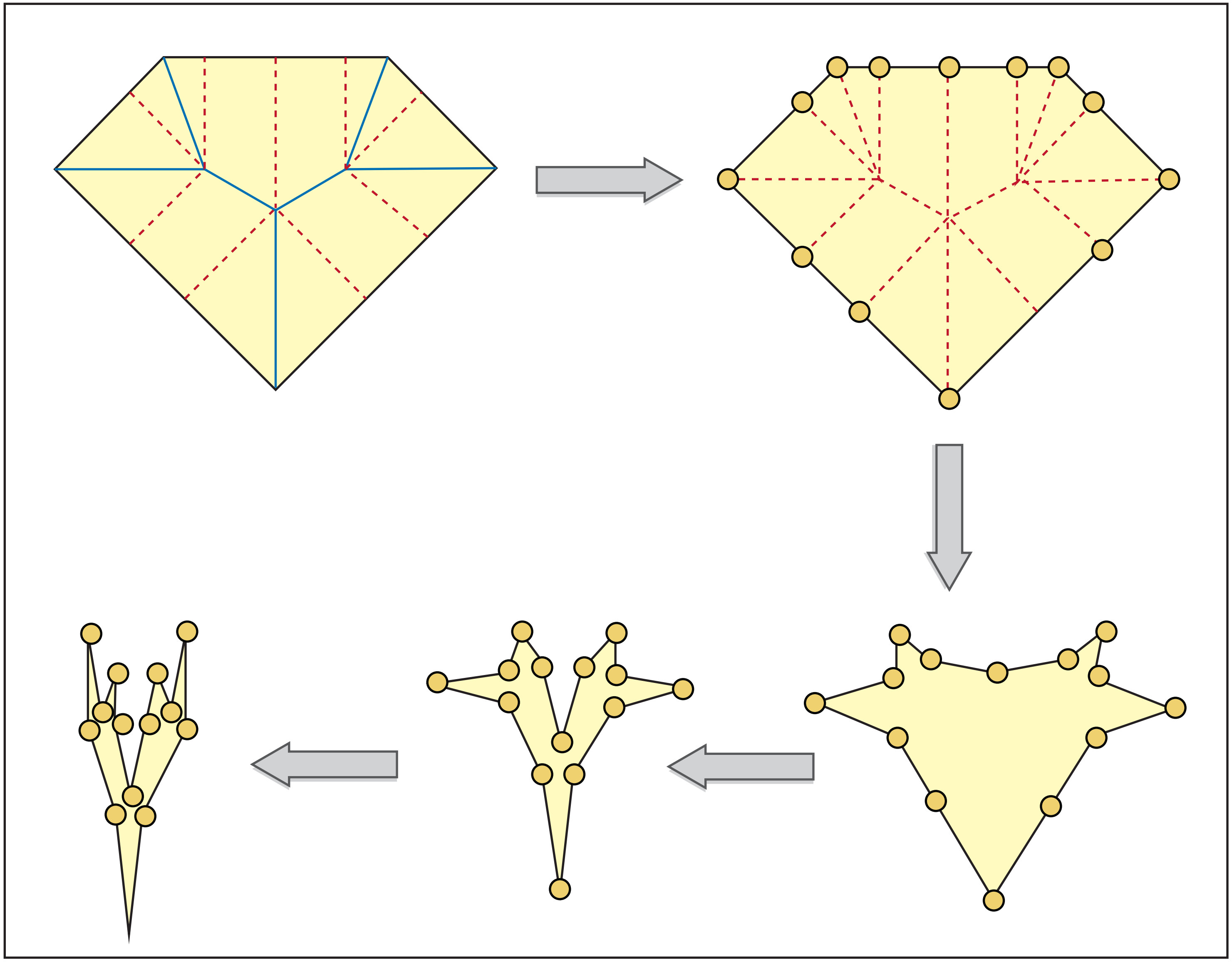
Refer to: Fig. 14.8 from Lang, Robert J. *Origami Design Secrets: Mathematical Methods for an Ancient Art*. 2nd ed. A K Peters / CRC Press, 2011.

I wonder how much this changes if you change from having a straight cut to one curved cut of fixed radius. Presumably, all your edges have to have that curve, but can you get interesting shapes out of it?

The explanation you gave a couple classes ago about what higher-dimensional folding means made sense to me at the time, but it makes considerably less sense now that you mentioned (this lecture) that you need to fold through the fourth dimension when you fold a grocery bag flat. [...] How do you explain this disconnect between theory and reality?



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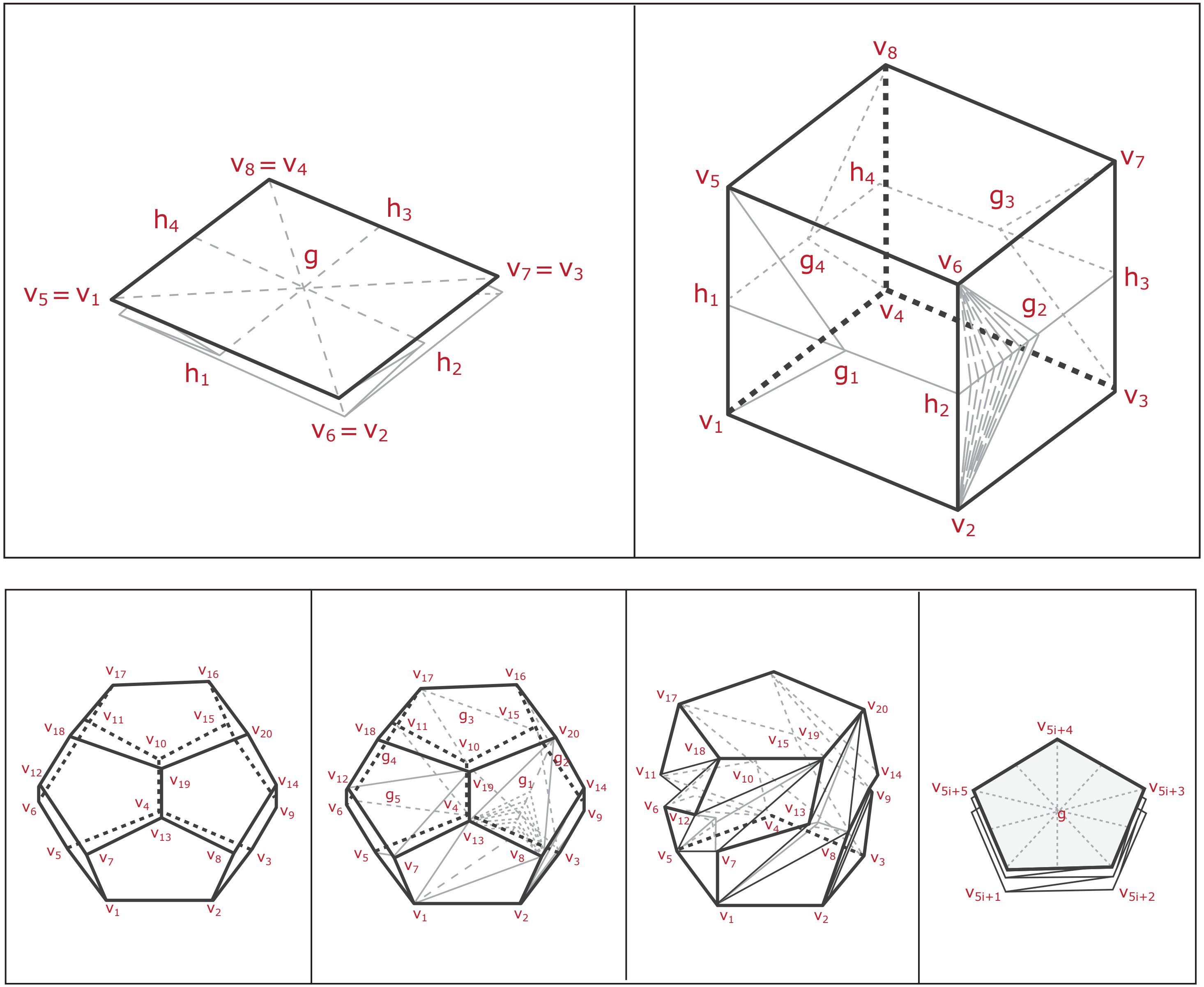
[Itoh, Nara, Vîlcu 2011]



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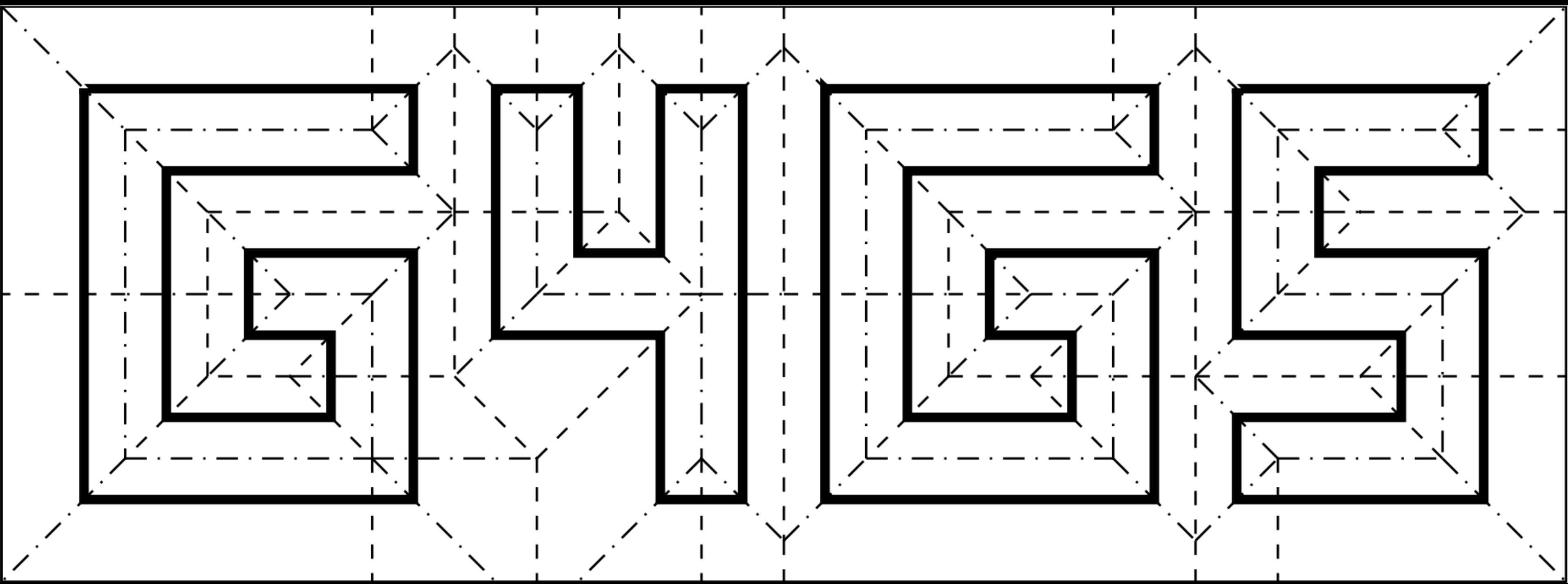

Courtesy of Erik Demaine and Martine Demaine. Used with permission.

[Demaine & Demaine 2002]

"Impenetrable Castle"
Peter Callesen
2005


"Distant Wish"
Peter Callesen
2006

“The Dying Swan II”
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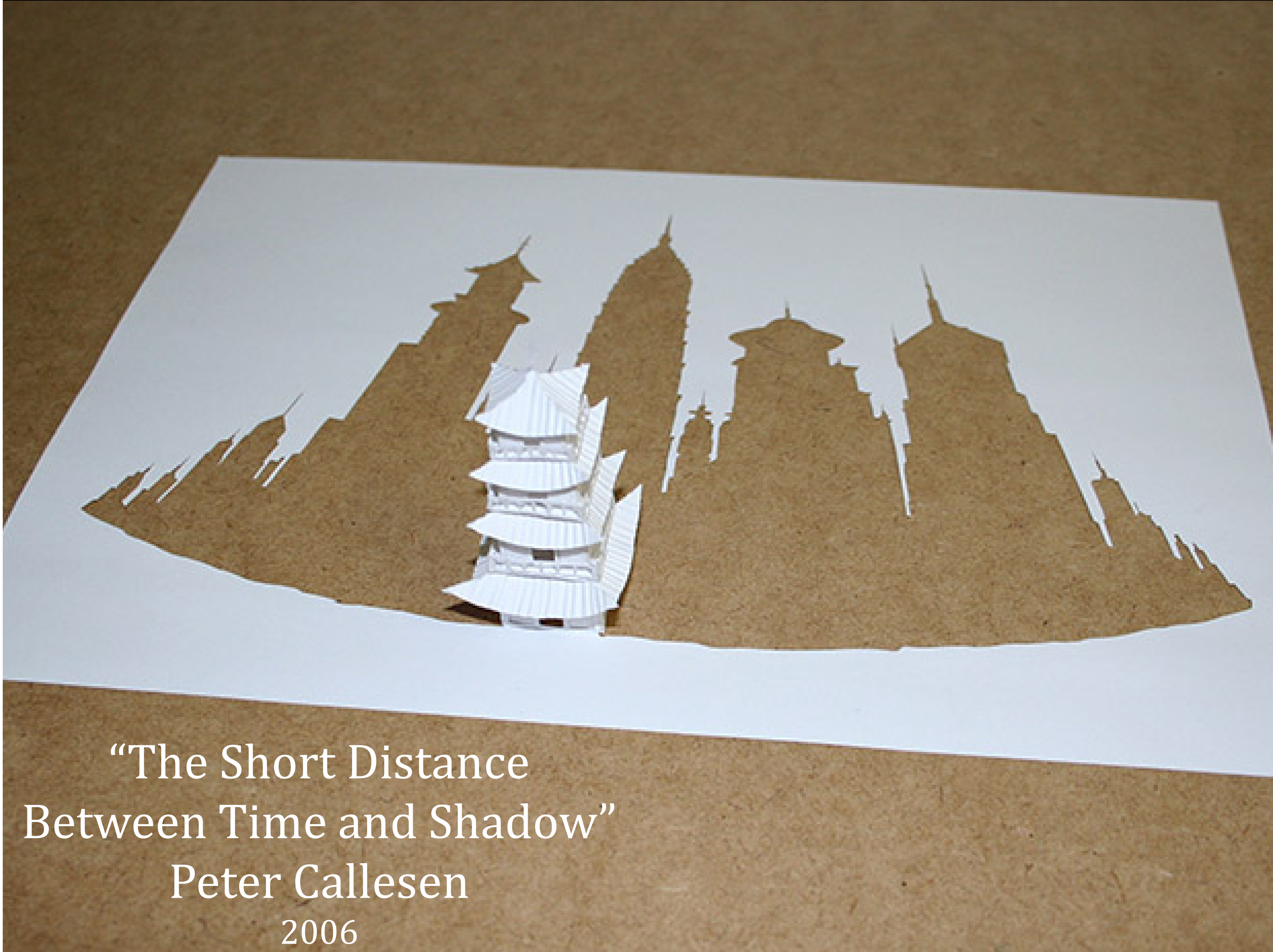
"The Short Distance
Between Time and Shadow"
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“Down the River”
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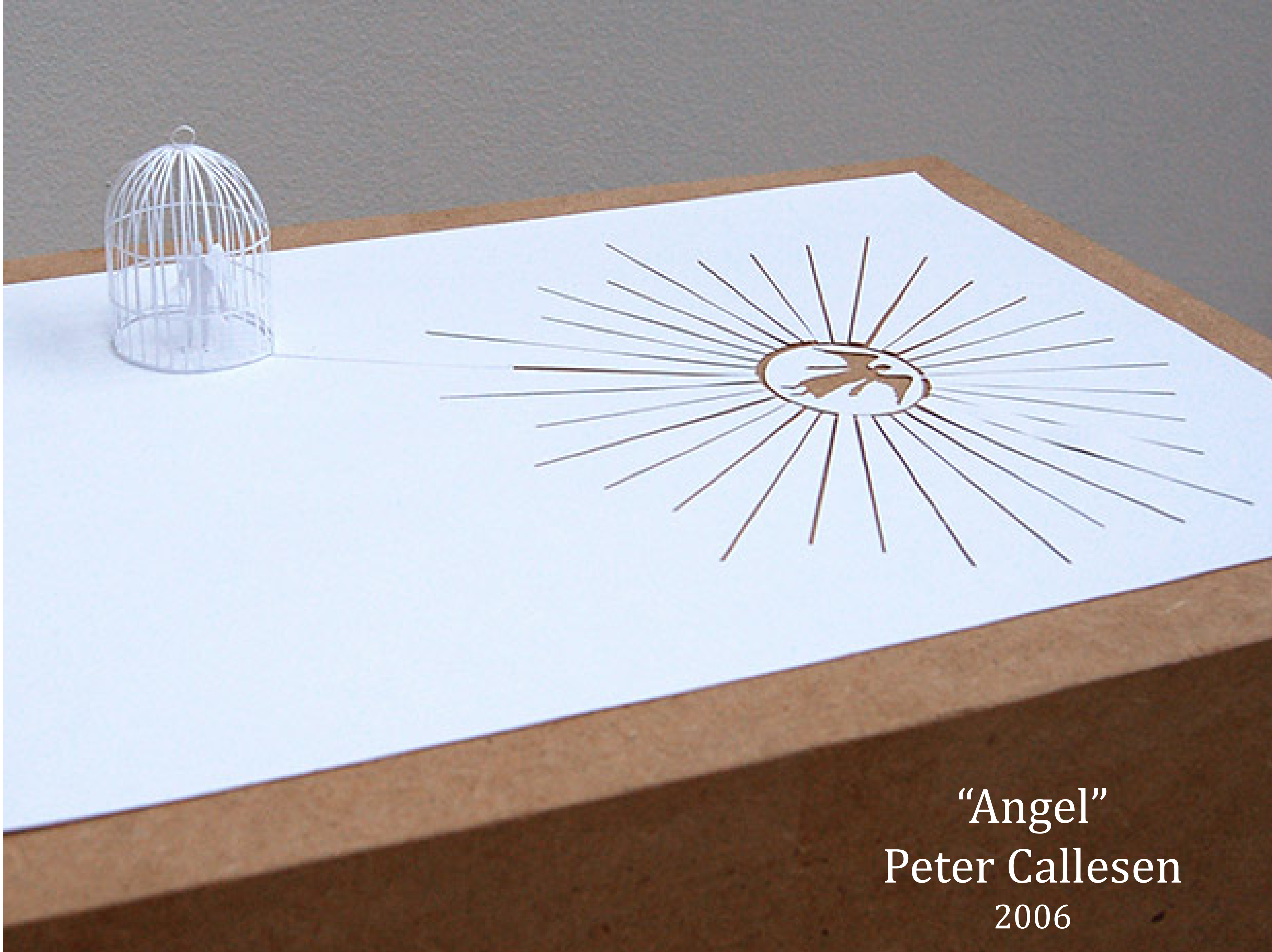
"Angel"
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