Walkable Curves and Knots

Robert Fathauer

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Selected ceramic sculptures completed since Bridges 2018

“Asymmetric Growth Form”

“Space Curves”

“Spiral Helix”

“72 Spikes”

“Swirly Dodec”

Walkable Mathematical Structures

Many of Escher prints feature traversable closed paths or multiple sets of stairs in unusual configurations.

Such imagined structures draw the viewer in, helping him or her appreciate the math content (Bosch's "3D Printed Tours").

Some real-world architectural structures contain features of this sort: stepwells and more modern structures

Such structures resonate with our curiosity and urge to explore, and fascinate us with their aura of enigma.

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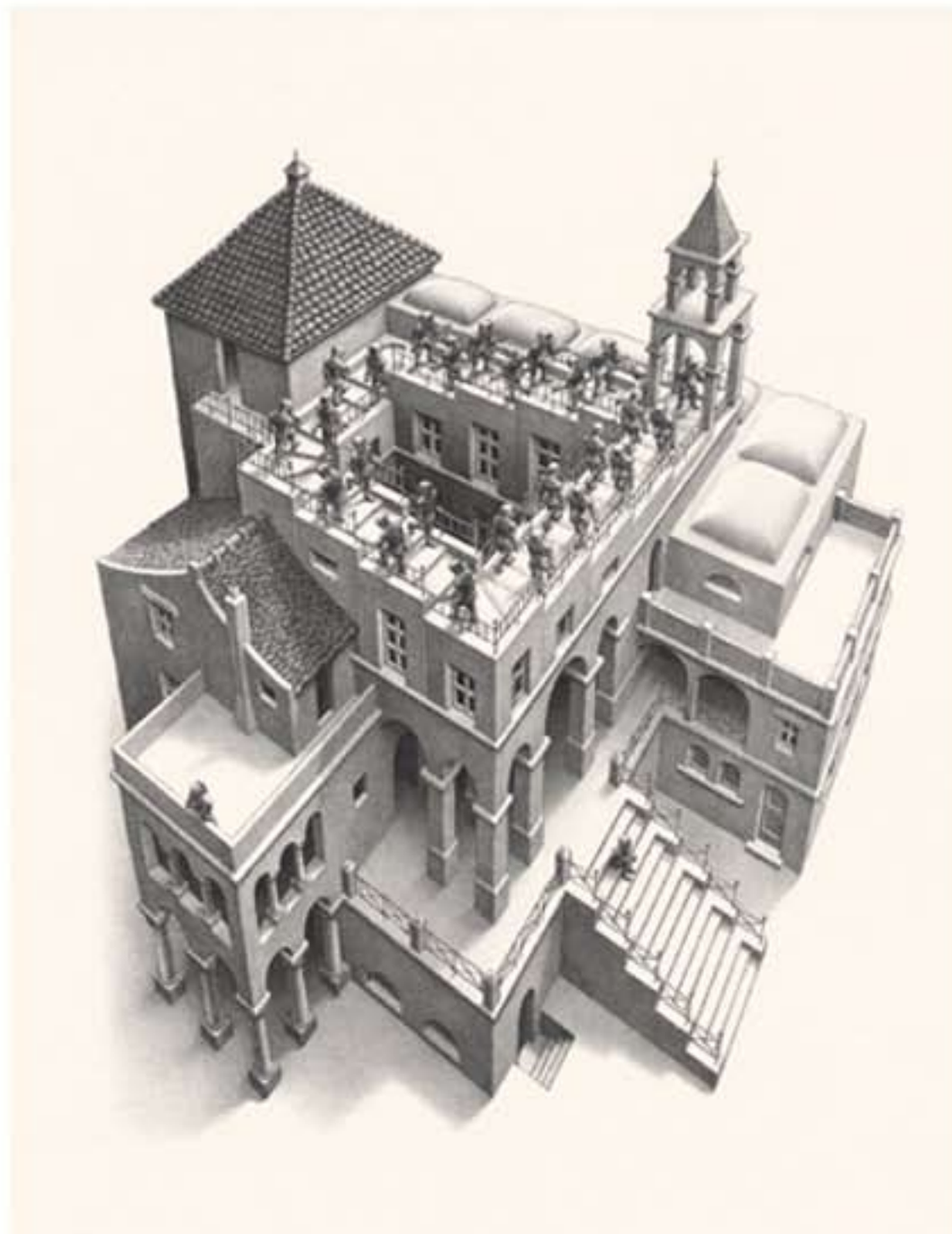

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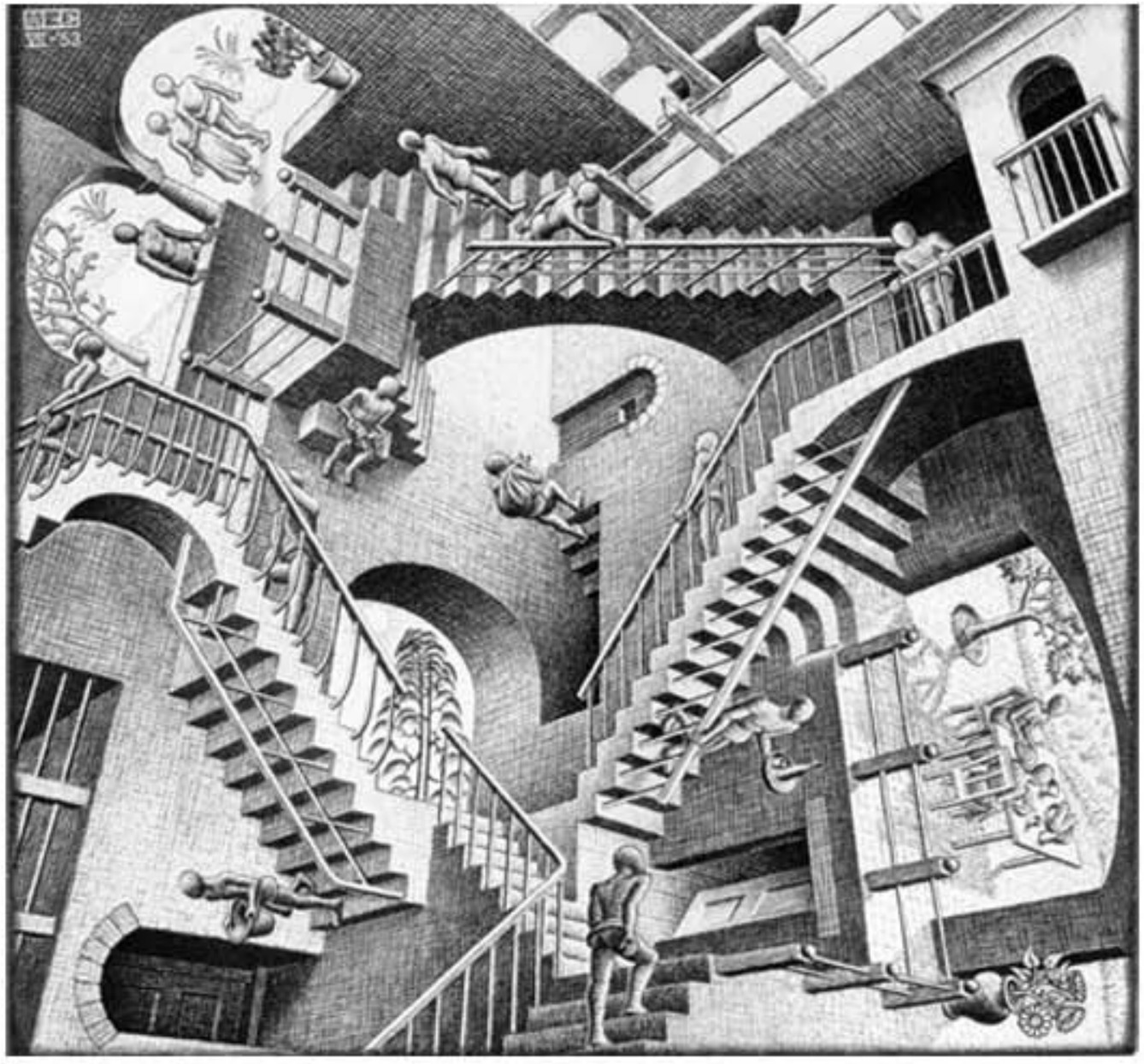

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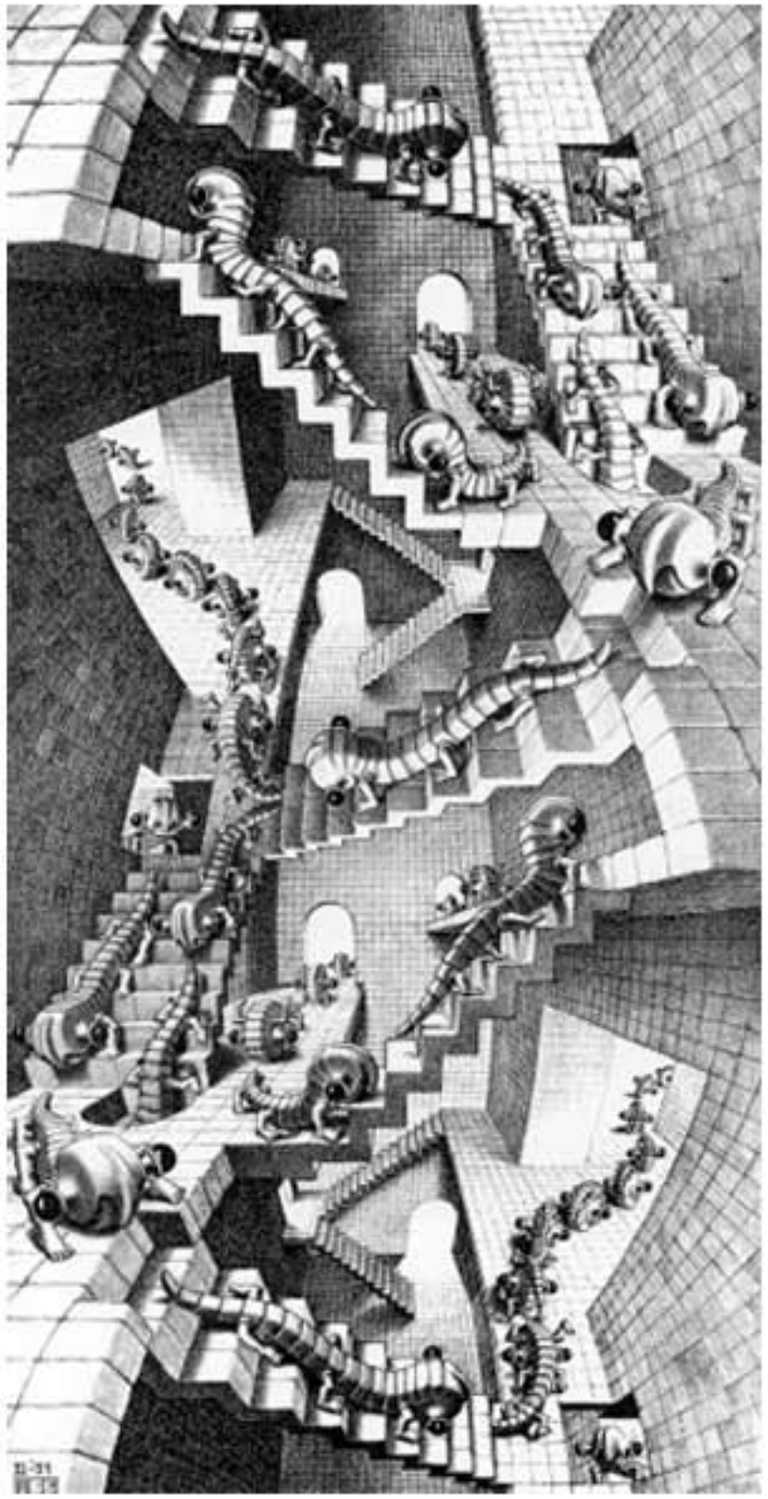

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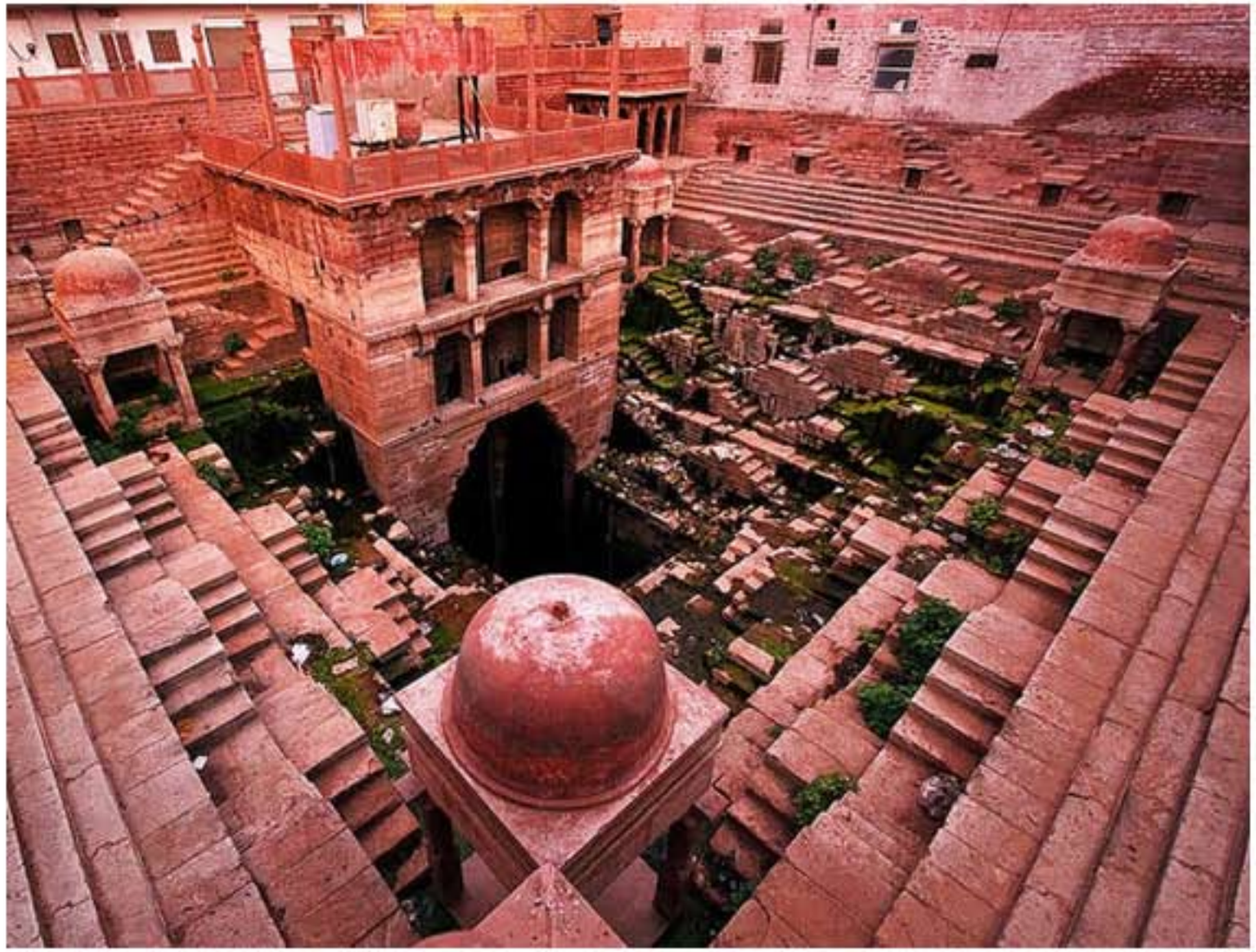

Toor Ji Ki Bawari, photograph by SaraswaT VaruN

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Chand Baori, from Wikimedia Commons

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Tiger & Turtle – Magic Mountain, Duisburg, Germany

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"Révolutions" © Michel de Broin, 2003 - Crédit photo: Guy L'Heureux, 2013

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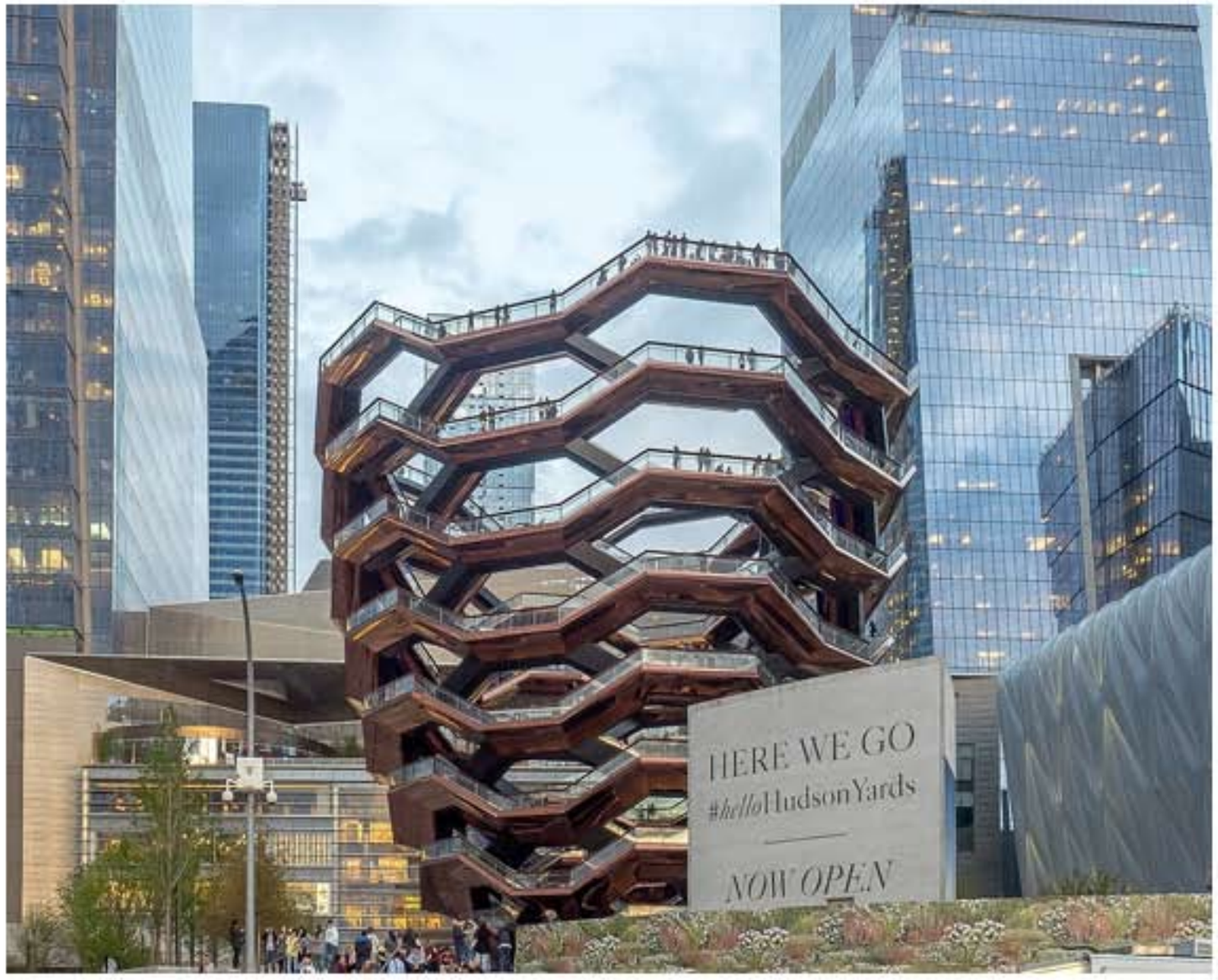

"Vessel", New York. By Ajay Suresh, https://flickr.com/photos/83136374@N05/47003439824

Conclusions

Real-world applications:

- Video games
- Public parks, playgrounds
- Architecture
- Toys such as marble runs

Future directions:

- Structures based on more 3D-geometric forms
- Impossible objects
- Topologically-interesting structures
- Realize a human-scale version of one of these structures

Develop software for creating such structures:

- Library of modules
- Automatic generation of a walkable structure for any knot, e.g.

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