IASS Annual Symposium 2019 – Structural Membranes 2019
Form and Force
7 – 10 October 2019, Barcelona, Spain

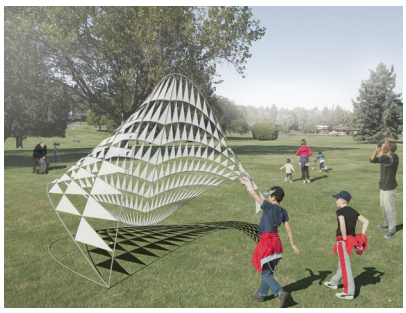
Reviving a Craft through Architecture: Fabrication of a lightweight pavilion based on wire-bending techniques

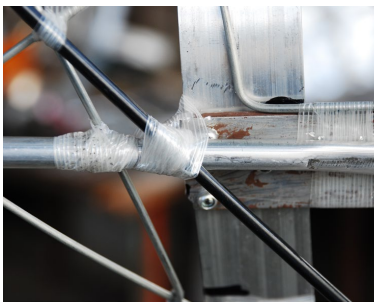
Vernelle A. A. NOEL*

*Visiting Assistant Professor, Georgia Institute of Technology
245 4th St NW, Atlanta, GA 30332. USA
vernelle@alum.mit.edu

Abstract

Wire-bending is a craft developed in the 1930s in Trinidad and Tobago. Wire, fiber glass and plastic rods, and other linear materials are bent with hand tools to create 2D and 3D structures that are performed during the carnival. This indigenous craft, however is disappearing due to dying and retiring practitioners, and techno-centric developments. This project seeks to employ novel computational approaches to reviving the craft by designing and fabricating a lightweight pavilion built on its techniques. Previous work in the fabrication of structures with linear rods elements include bamboo grid-shells [1]; CNC knit and GFRP rods [2]. Previous work in fabrication in wire-bending includes: (a) the creation of novel approaches to the craft that include traditional tools, digital design and fabrication tools and processes; and (b) the design and fabrication of a lightweight mobile structure using digital fabrication approaches [3]. Unlike previous work, this project not only explores the construction of a pavilion at the architectural scale built on wire-bending techniques, but it also includes structural testing and analyses of the connections being employed. Traditional fabrication involves using linear rod materials that include galvanized steel, rattan, cane, fiber glass, etc.; bent wires, and adhesive tapes for wrapping connections. We will also experiment with new materials and techniques not currently used in the practice. Potential impacts of this work are far reaching. Linear rod materials like wires are easily procurable and accessible in many places around the globe. Currently, an architecture built on this indigenous technique of wire-bending does not exist in Trinidad and Tobago, nor anywhere else in the world to my knowledge. The logic of this craft could be extended for application in other linear rod, and lightweight materials. These materials and techniques can be used where temporary, mobile, and lightweight shelter is needed, for example, in cases of natural disasters or refugee crises. Studying the strength and structural qualities of these connections is an important issue to enable quick and strong erection of these structures.





References

[1] K. Crolla, "Bending Bamboo Rules: Beyond Century-Old Typologies," *J. Archit. Educ.*, vol. 72, no. 1, pp. 135–145, Jan. 2018.

[2] S. Ahlquist and J. Lienhard, "Physical and Numerical Prototyping for Integrated Bending and Form-Active Textile Hybrid Structures," 2013.

[3] V. A. A. Noel, "From Costuming and Dancing Sculptures to Architecture: The Corporeal and Computational in Design and Fabrication of Lightweight Mobile Structures," in *Future Trajectories of Computation in Design*, Istanbul, Turkey, 2017, pp. 22–41.