
4D Printing A-line

Guanyun Wang*, Ye Tao*, Ozguc Bertug Capunaman, Humphrey Yang, Lining Yao

*The first two authors contributed equally to this work.

Morphing Matter Lab, Human-Computer Interaction Institute,
Carnegie Mellon University
{guanyunw,ytao2,ocapunam,hanliny,liningy}@andrew.cmu.edu

ABSTRACT

In this video, we showcased "A-line" [1], a 4D printing system for designing and fabricating morphing three-dimensional shapes out of simple linear elements. A-line integrates a method of bending angle control in up to eight directions for one printed line segment, using a single type of thermoplastic material. A software platform to support the design, simulation and tool path generation is developed to support the design and manufacturing of various A-line structures. The video showcases the design space of A-line, including the unique properties of line sculpting, the suitability for compliant mechanisms and ability to travel through narrow spaces and self-deploy or self-lock on site.

CCS CONCEPTS

• **Human-centered computing** → **Interactive systems and tools.**

REFERENCES

- [1] Guanyun Wang, Ye Tao, Ozguc Bertug Capunaman, Humphrey Yang, and Lining Yao. 2019. A-line: 4D Printing Morphing Linear Composite Structures. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. ACM, 426.

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

CHI'19 Extended Abstracts, May 4–9, 2019, Glasgow, Scotland UK

© 2019 Copyright held by the owner/author(s).

ACM ISBN 978-1-4503-5971-9/19/05.

<https://doi.org/10.1145/3290607.3311775>