

Computationally Enhanced Construction Kits and Craft

Construction kits—toys for building or assembling physical models—have historically played a powerful educational role in children's lives. These kits—geometric design sets, erector sets, architectural blocks, anatomical models, chemical modeling kits—have manifest strengths: children make three-dimensional models and learn through tactile experience. Traditional construction kits also have striking limitations. They offer little direct communication—for example, a traditional kit cannot offer information or advice about how to proceed in building a model. Even more importantly, traditional construction kits tend to be aesthetically and behaviorally limited.

Through embedded computation, pieces within a construction kit may communicate with each other, with desktop machines, and with their users. By integrating construction kits with computation, the educational power and expressiveness of these kits can be greatly increased.



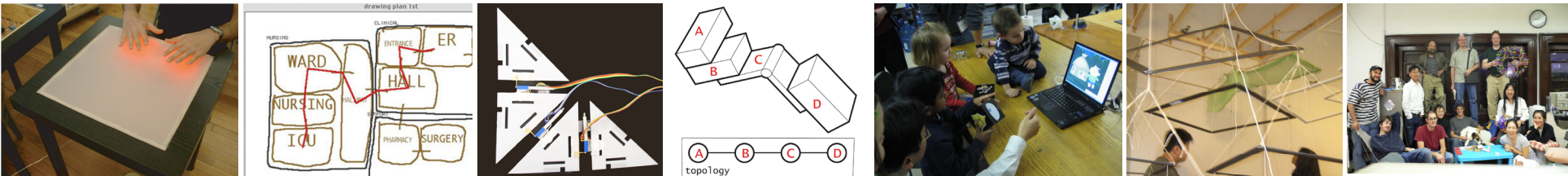
What is the CoDe Lab?

Engaging with students in the School of Architecture’s long-standing graduate program in computational design as well as others the CoDe Lab began in Fall 2004, co-directed by Mark D Gross and Ellen Yi-Luen Do*.

The Lab is home to over a dozen graduate and undergraduate students and visiting scholars from around the world with backgrounds in architecture, design, computer science, and engineering. Currently our work is supported by the National Science Foundation and the Pennsylvania Infrastructure Technology Alliance.

We work on a diverse range of topics at the intersection of computation and design. In the tradition of the Bauhaus and the Media Lab, we investigate by building things in software and hardware. Building working prototypes is central to our everyday activities. We see as a path to understanding fundamental questions of design.

* In January 2006 Ellen Yi-Luen Do left CMU to take a joint position in Human-Centered Computing program in College of Computing and the PhD program in the College of Architecture at Georgia Tech.



Open House / Demo Day

TUESDAY MARCH 7, 4:30 - 7:30

MMCH 407

Please come to our Open House / Demo Day

TUESDAY MARCH 7, 4:30 - 7:30 in MMCH 407

Graduate students in the School of Architecture's Computational Design Lab will demonstrate works-in-progress on computationally enhanced toys, construction kits, and craft.

Working demos will include:

- Flexy - a hub-and-strut modeling kit
- Furniture Factory & Design-O-Saur - sketch-based design for fabrication
- Bach Blocks & Tangible Notes
- roBlocks - a kit for reconfigurable robots
- Possibilities - a design game
- Storytelling Blocks

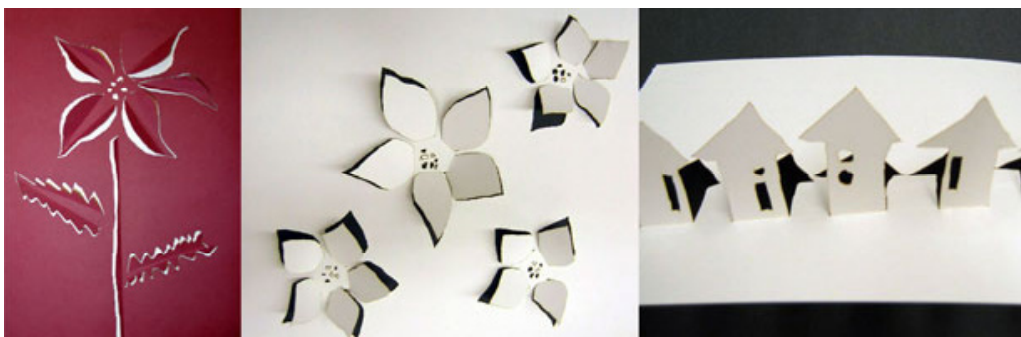
and more ...

Refreshments served

<<http://code.arc.cmu.edu>>

Thinking with Your Hands:

Making 3-dimensional Design and Production More Intuitive



Recently we have seen rapid transformations of companies as they adopt information technology. Rapid prototyping and manufacturing is becoming a critical competitive edge for economic development in architecture, engineering, and construction (AEC) industries. AEC designers are adopting CAD/CAM technology originally pioneered by mechanical and industrial engineering firms.

Leading edge building design firms (e.g., Norman Foster LLC, and Frank Gehry) employ rapid prototyped models to produce building designs. As small and middle size firms in Pennsylvania and throughout the nation follow this will have an enormous impact.

Designers use off-the-shelf geometric CAD software for rapid manufacturing. This powerful software requires a designer to create detailed and precise representations and to operate a complex model-making interface. Therefore: (1) designers invest a great deal of time and effort in mastering this software, and (2) it is difficult to quickly make rough prototype designs. These two consequences limit the effectiveness of rapid manufacturing in conceptual design, and needlessly restrict its application to designers who are willing and able to become experts in CAD/CAM modeling. This project develops strategies—both technological and pedagogical—to eliminate these two obstacles.