Computationally Enhanced Construction Kits & Craft NSF ITR 0326054 Mark D Gross (Carnegie Mellon) and Mike Eisenberg (U. Colorado) research assistants: G. Johnson, S. Moon, Y.Oh, E. Schweikardt, M. Weller



Construction kits—such as geometric design sets, erector sets, architectural blocks, anatomical models, chemical modeling kits— toys designed for the building or assembly of physical models—have historically played a powerful educational role in children's lives. This project is developing a wide variety of *computationally-enhanced construction kits*, focusing on scientific, mathematical, and engineering domains (such as solid geometry, molecular chemistry, architectural design, and anatomy). Through the use of embedded computation, pieces within a construction kit may communicate with *each other*, with *desktop machines*, and with their *users*; and overall, by integrating construction kits with computation, the educational power and expressiveness of these kits can be greatly increased.



flatCAD programming language to model and build

roBlocks construction kit for exploring embedded

Furniture Factory sketch-based software for rapid CAD

Posey electronically enhanced hub-and-strut kit connects

construction kits

parallel computation

prototyping

physical models to your computer



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Quick-blocks self-assembling modular robot building blocks (with Goldstein's "Claytronics" group)