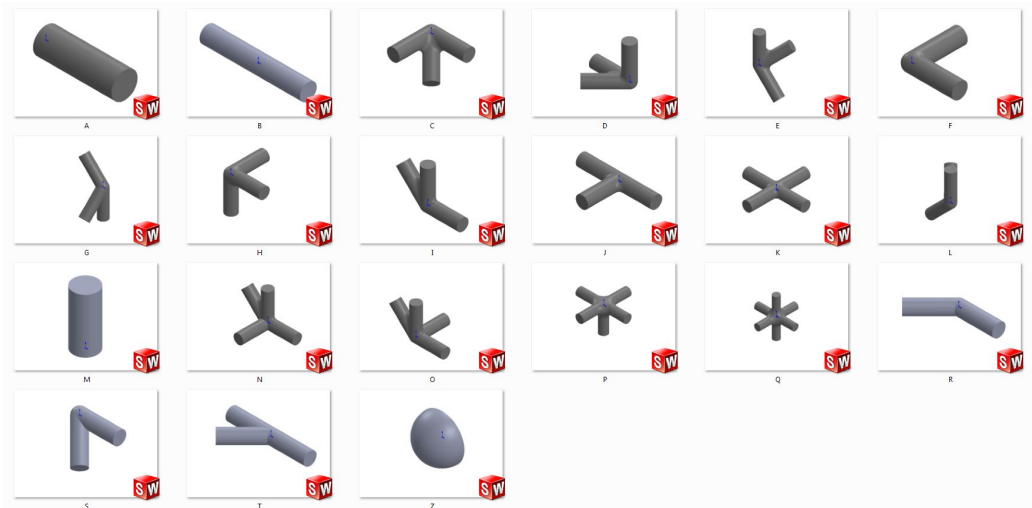# Geometer

v7.0

Jason Depenbrock + David Troetschel

>"We want to introduce **_one_** potential use case"<

1. **Need to know:** Adults need to know the reason for learning something.
2. **Foundation:** Experience (including error) provides the basis for learning activities.
3. **Self-concept:** Adults need to be responsible for their decisions on education; involvement in the planning and evaluation of their instruction.
4. **Readiness:** Adults are most interested in learning subjects having immediate relevance to their work and/or personal lives.
5. **Orientation:** Adult learning is problem-centered rather than content-oriented.
6. **Motivation:** Adults respond better to internal versus external motivators.

What is Geometer?

A Holistic Design Tool for Creating, Communicating and Manufacturing Advanced Human-Scale Forms.

"We made geometer as a….

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(1) A kit of robust physical and digital components with unique names and specific geometry which can be combined in a modular fashion.

(2) A system of communicating the interactions of these components.

(3) A way to easily physically manufacture complex assemblies made up of modules, in a variety of materials reliably of considerable size.

Because while we all want things, sometimes it's easiest to just buy them; but many people find that there is a kind of satisfaction in having conceived of and then built something themselves.
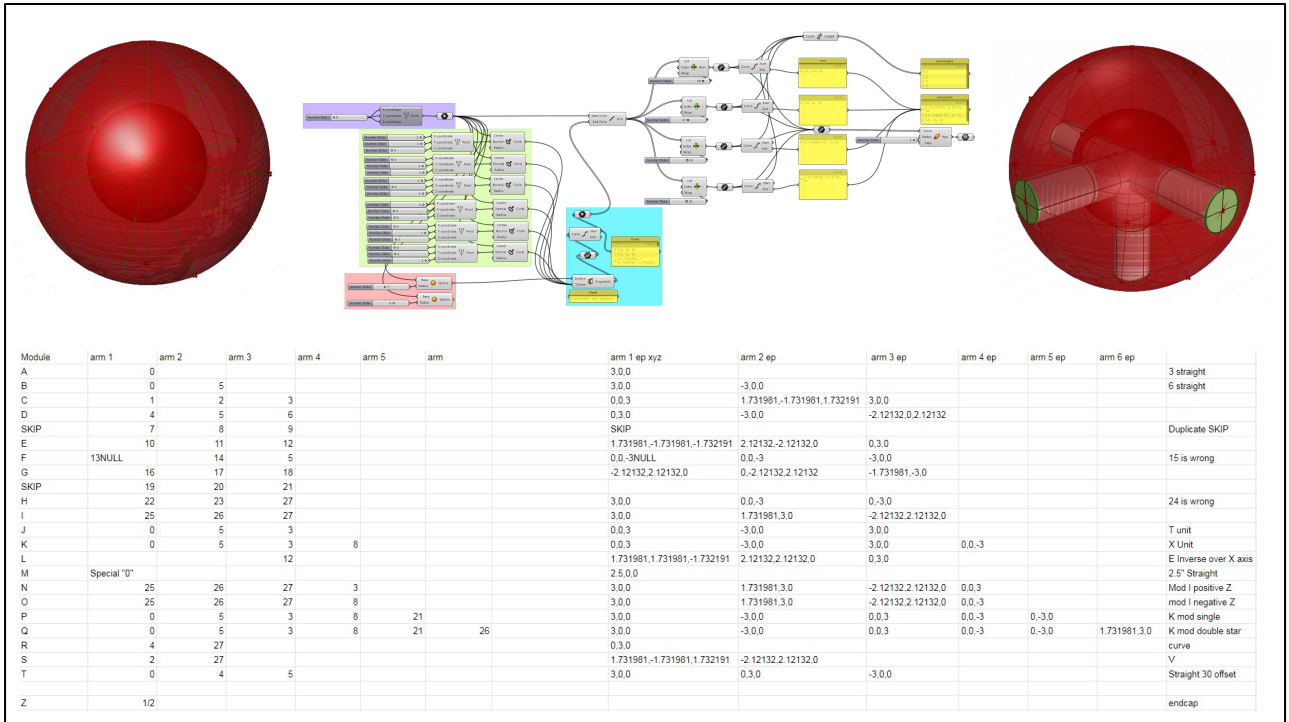With makerspaces, instructional content on the internet in the form of blogs, videos and more, we're seeing more individuals participating in DIY or Maker culture every day.

A desire for realistic, meaningful things over gadgets and novelties as the output of this effort drives many makers towards high level craft processes. Most people bite off more than they can chew. (While much can be learned from failure, we think this is one are Geometer can help)

Geometer has been optimized to help beginner and expert designers alike to(design and)make human-scale scale structures in a variety of materials using open ended molds and casting. Each module has a corresponding mold which can connect to others to form assemblies.

Module	arm 1	arm 2	arm 3	arm 4	arm 5	arm	arm 1 ep xyz	arm 2 ep	arm 3 ep	arm 4 ep	arm 5 ep	arm 6 ep	
A	0						3,0,0						3 straight
B	0	5					3,0,0	-3,0,0					6 straight
C	1	2	3				0,0,3	1.731981,-1.731981,1.732191	3,0,0				
D	4	5	6				0,3,0	-3,0,0	-2.12132,0,2.12132				
SKIP	7	8	9				SKIP						Duplicate SKIP
E	10	11	12				1.731981,-1.731981,-1.732191	2.12132,-2.12132,0	0,3,0				
F	13NULL		14	5			0,0,-3NULL	0,0,-3	-3,0,0				15 is wrong
G	16	17	18				-2.12132,2.12132,0	0,-2.12132,2.12132	-1.731981,-3,0				
SKIP	19	20	21										
H	22	23	27				3,0,0	0,0,-3	0,-3,0				24 is wrong
I	25	26	27				3,0,0	1.731981,3,0	-2.12132,2.12132,0				
J	0	5	3				0,0,3	-3,0,0	3,0,0				T unit
K	0	5	3	8			0,0,3	-3,0,0	3,0,0	0,0,-3			X Unit
L			12				1.731981,1.731981,-1.732191	2.12132,2.12132,0	0,3,0				E Inverse over X axis
M	Special "0"						2.5,0,0						2.5" Straight
N	25	26	27	3			3,0,0	1.731981,3,0	-2.12132,2.12132,0	0,0,3			Mod I positive Z
O	25	26	27	8			3,0,0	1.731981,3,0	-2.12132,2.12132,0	0,0,-3			mod I negative Z
P	0	5	3	8	21		3,0,0	-3,0,0	0,0,3	0,0,-3	0,-3,0		K mod single
Q	0	5	3	8	21	26	3,0,0	-3,0,0	0,0,3	0,0,-3	0,-3,0	1.731981,3,0	K mod double star
R	4	27					0,3,0						curve
S	2	27					1.731981,-1.731981,1.732191	-2.12132,2.12132,0					V
T	0	4	5				3,0,0	0,3,0	-3,0,0				Straight 30 offset
Z		1/2											endcap

We took care of the math and underlying system so users can easily adopt and adapt geometer into their workflow (while still being in the loop).
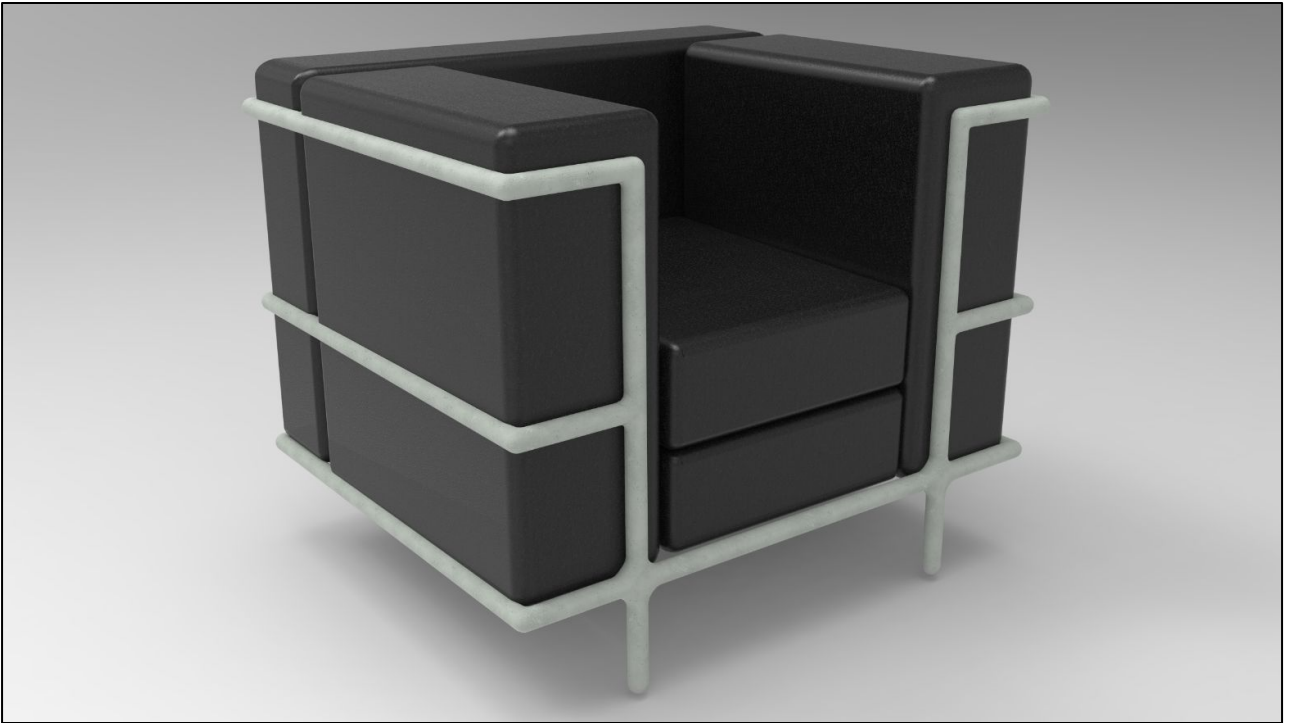
So they can more easily make something like this:

(cost compare? We know how much the real deal costs.)
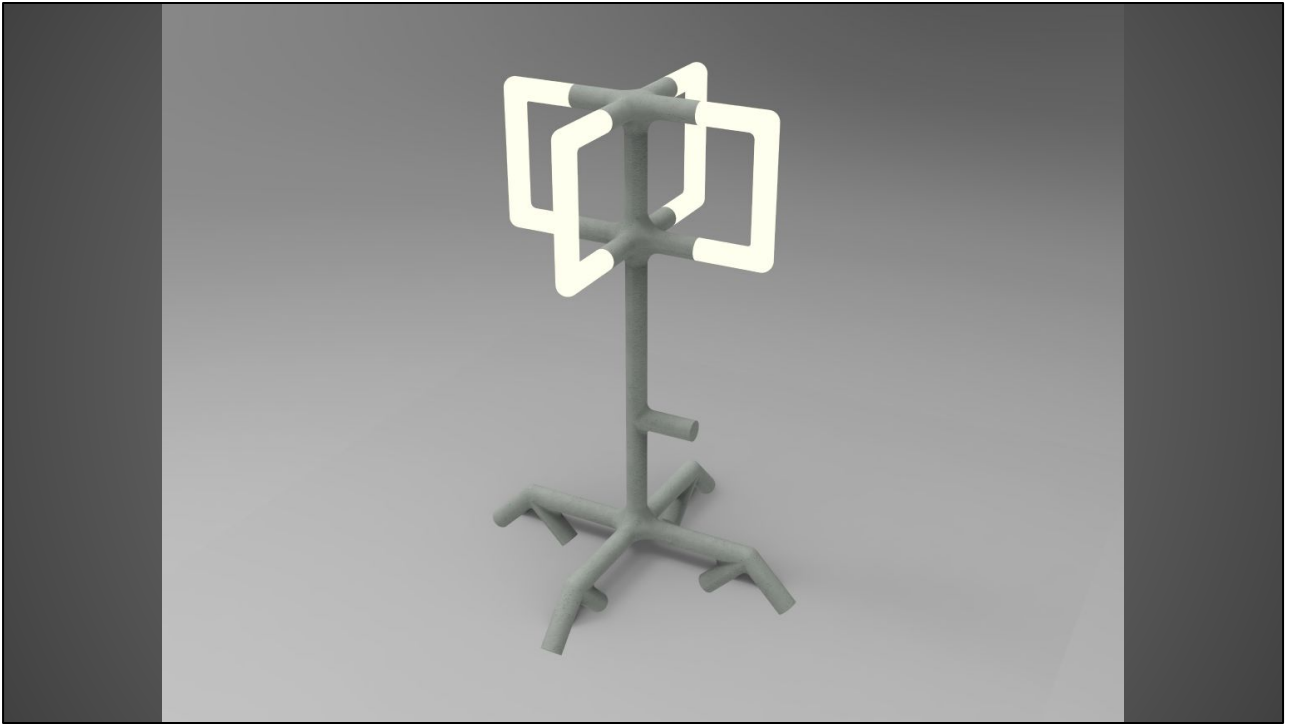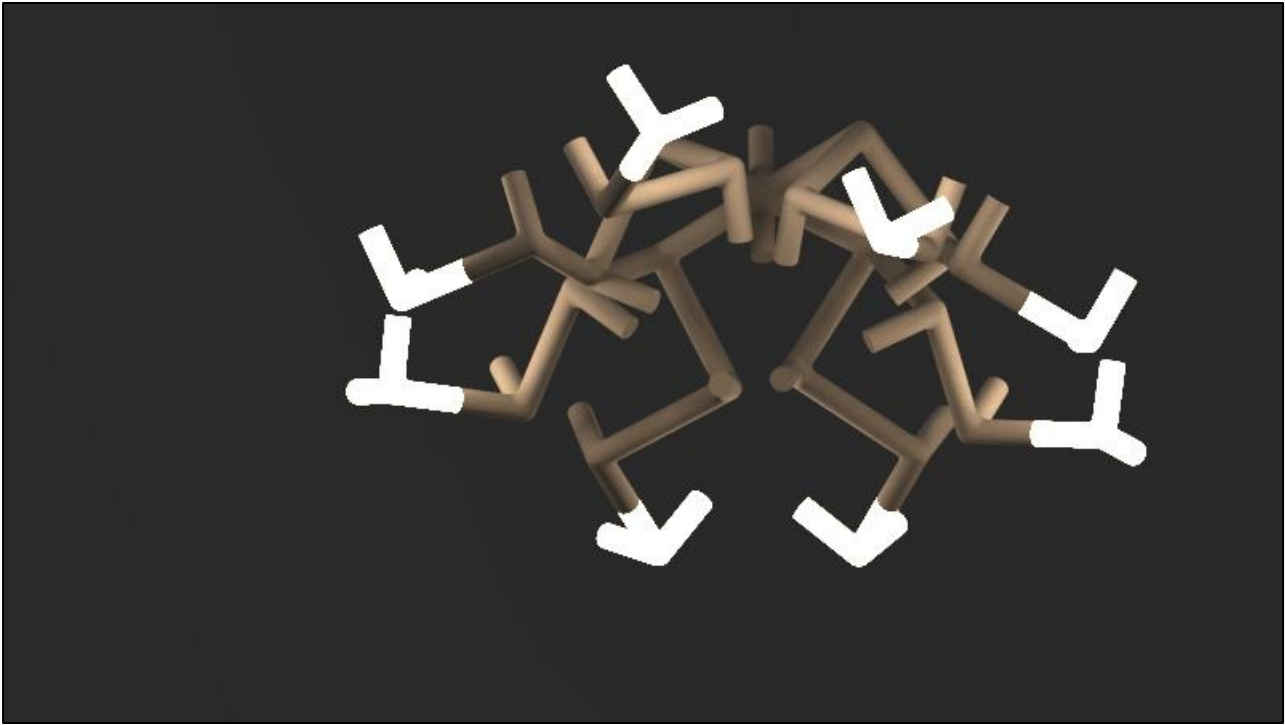
Key Collaborators:

Seth Moczydlowski

Industrial Designer /
Mechanical Engineer at Sherpa
Design, Inc.

"Find a way to simplify. If people get a kit of parts
and don't come up with anything quickly- they are going
to get frustrated and put it down." "If you give them an
example to build then they will be able to make more
things, if i can build a cube then i can build something
else"

Jeff Bare

Product development associate

BDI Furniture

"I've always been impressed With some Designers that
employ code and parametric design Ie. Nervous
System, But i've never had any desire to learn to
code and do it myself."

So, we want to run through a description of potential user; they are involved in the DIY and maker communities and recently decided that they would like to join a co-working space with access to tools and other like-minded people.
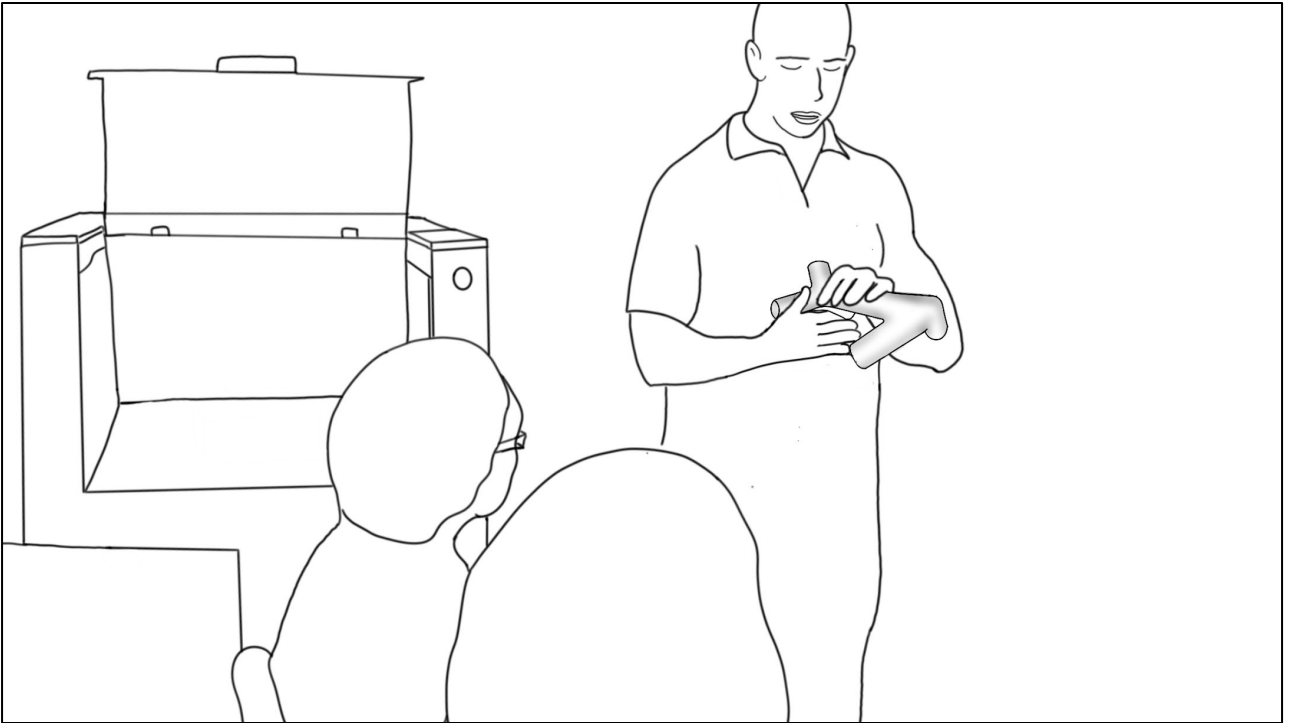
-On tour/orientation: While on tour of Nextfabs facilities
they learn about many tools, many of which they have never
worked with before. The tour guide shows them plasma
cutters, 3D printers and more, Geometer is one of these
many tools. The tour guide explains the benefits and
drawbacks of each of these tools
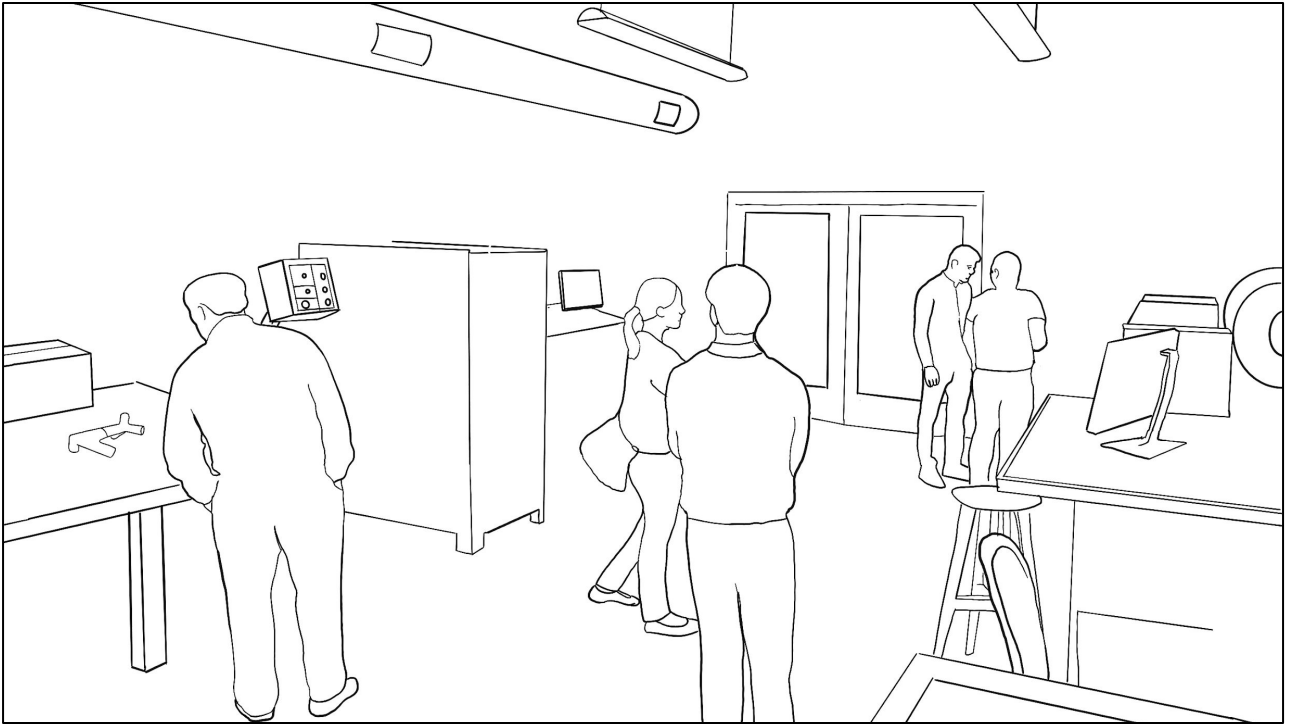
-On tour: inspecting Geometer box. ____ makes mental notes of which tools they are interested in and daydreams about what they might make given the time and energy.

-Working: ___ enjoys their new work environment, as time
allows they learn to use tools, some of which cost money
and others which have little to no operating cost.
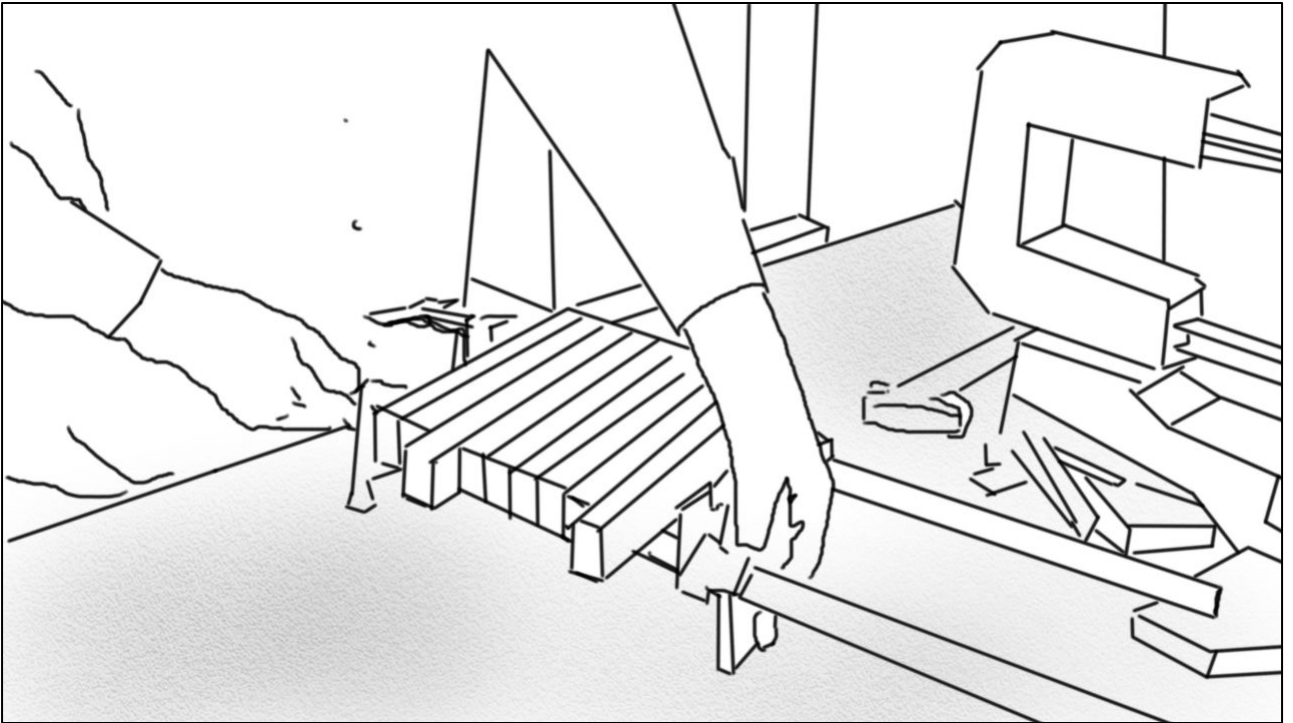
They dabble in making things like cutting boards.
-Cutting board slide

-Working: One of the benefits of nextfab is access to otherwise cost prohibitive software; ____ may or may not have prior cad experience but they notice that on all of the Nextfab desktops there is a folder labeled Geometer.
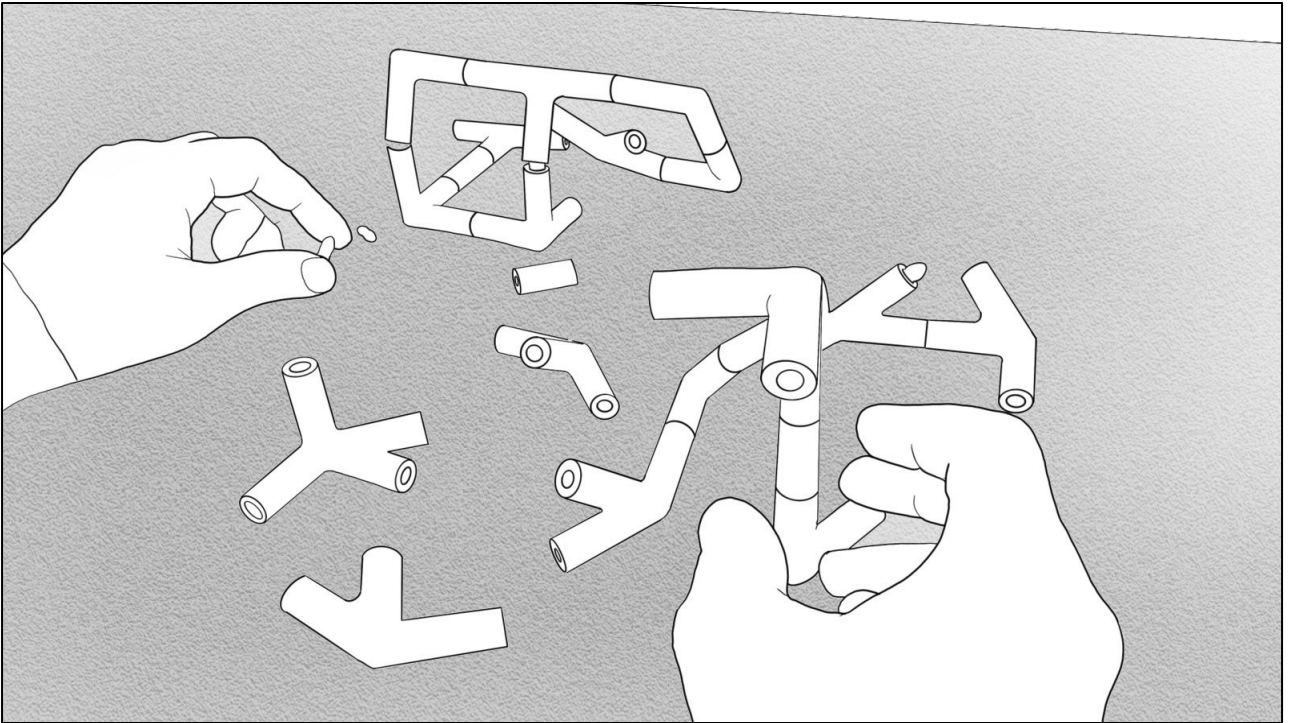
-On lunch break: They notice a small box of toy like
building modules in the break area labeled Geometer and
make a small scale model sculpture.
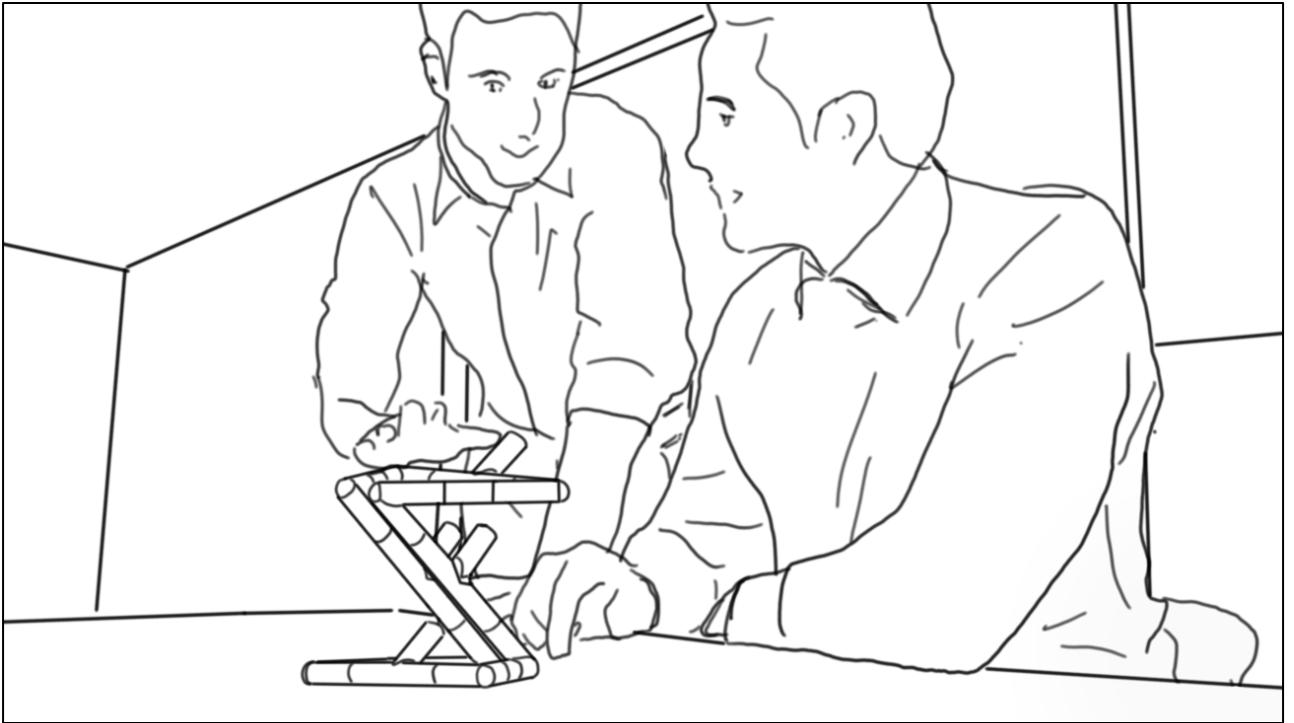
Others comment that it looks cool and that these toy versions are just half scale and that they could build it easily downstairs.
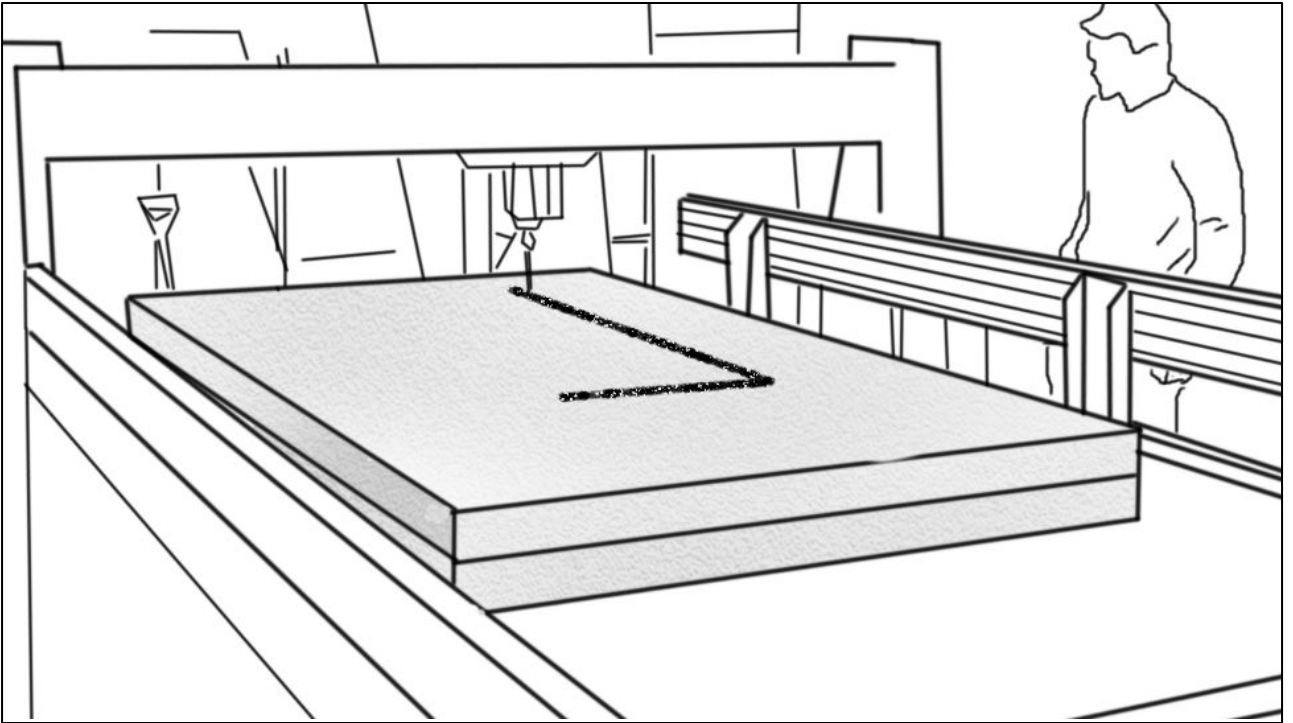
-Evaluating options: Time passes and _____ slowly expands
their knowledge of tools available to them. They want to
learn how to use the CNC because the things it makes are
really cool but are off-put by the hours involved and
complexity. (admiring CNC)

-Working, bored: "One day while working on one of the nextfab computers" they get bored and decide to explore the Geometer folder.

gravity sketch
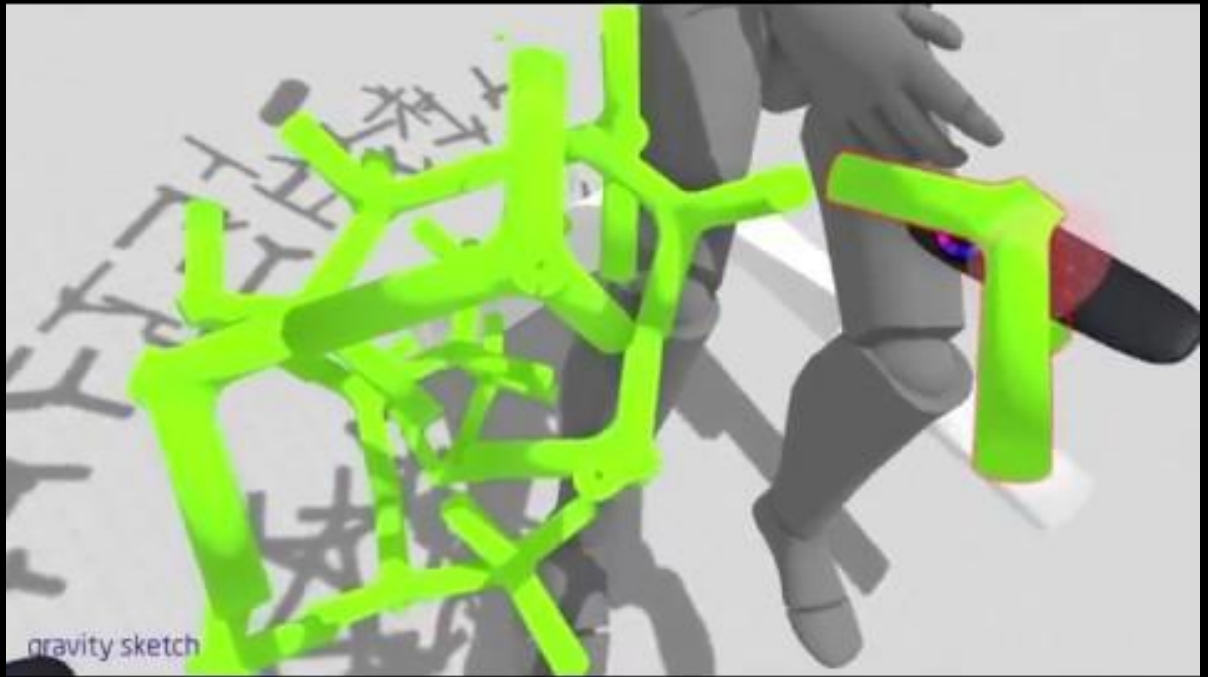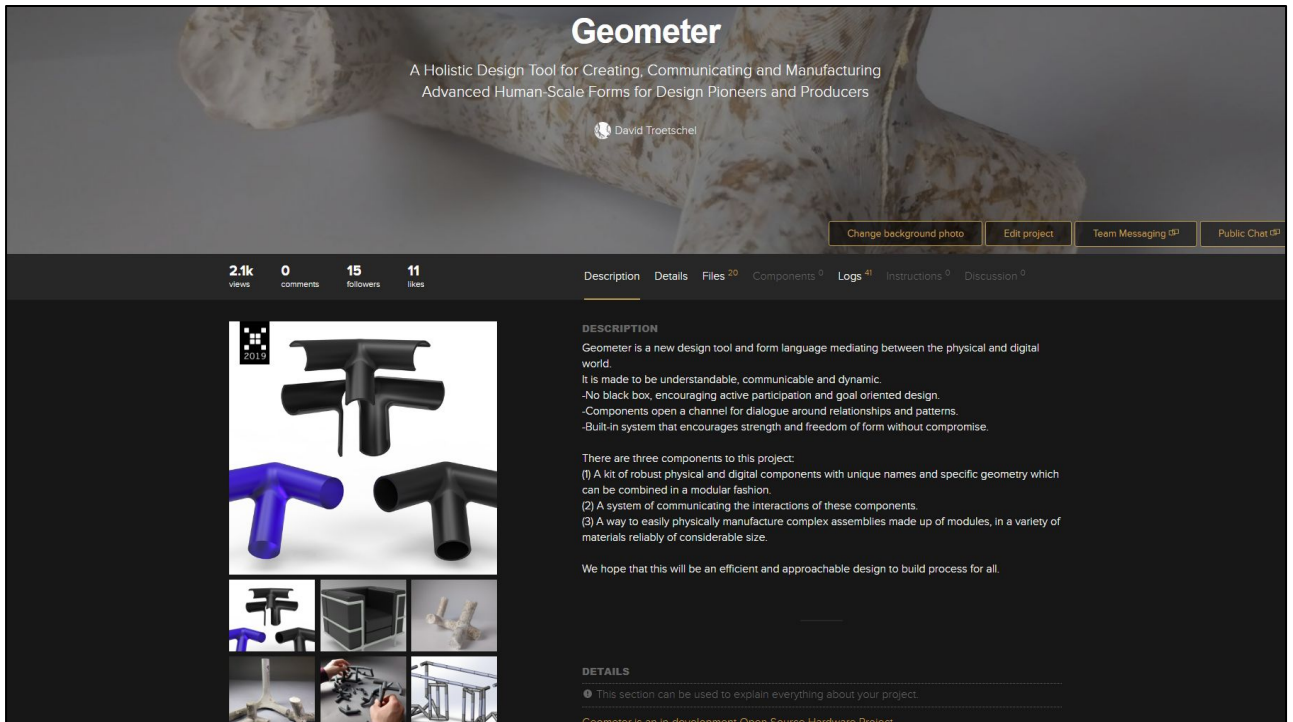
-Finds documentation page: one of the files in the
Geometer folder links to documentation which they also saw
in passing during their google searches and starts to see
examples of other people's work, they shift from just
gestural examples to practical ideas as well.
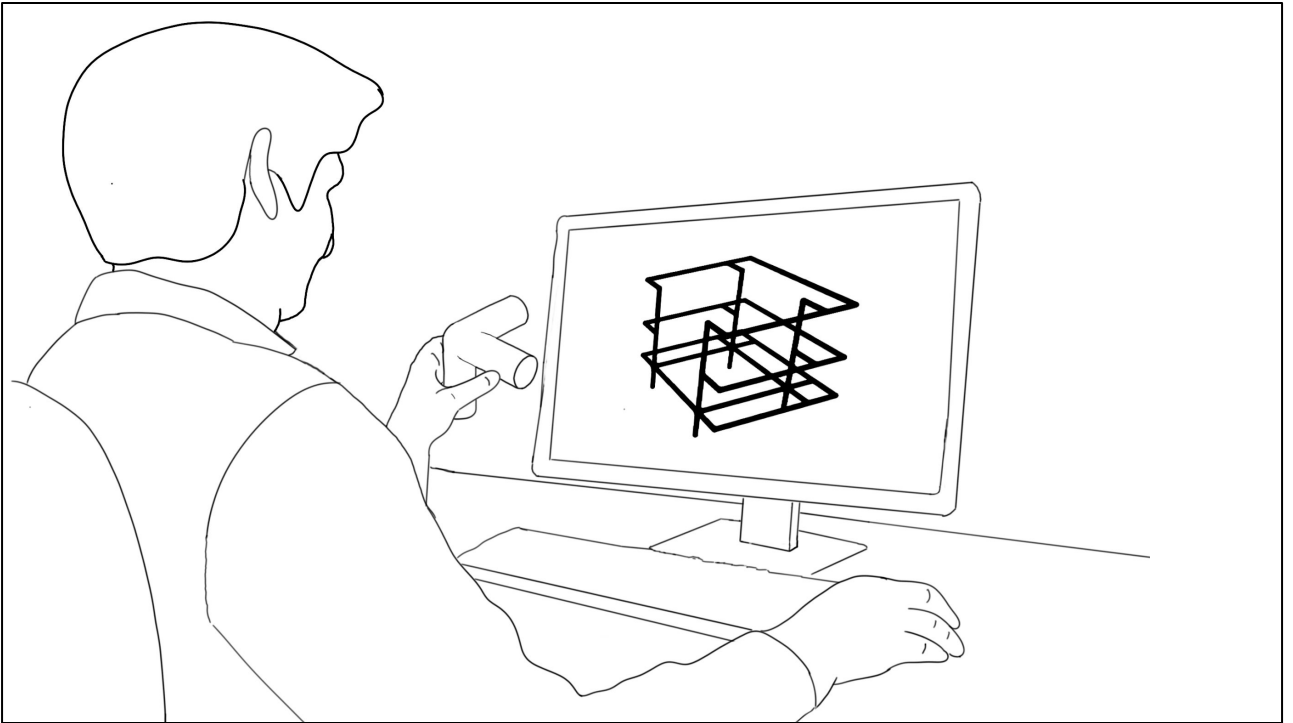
-Complex assembly: On breaks ____ gets progressively
better and others start to notice. (showing others screen)
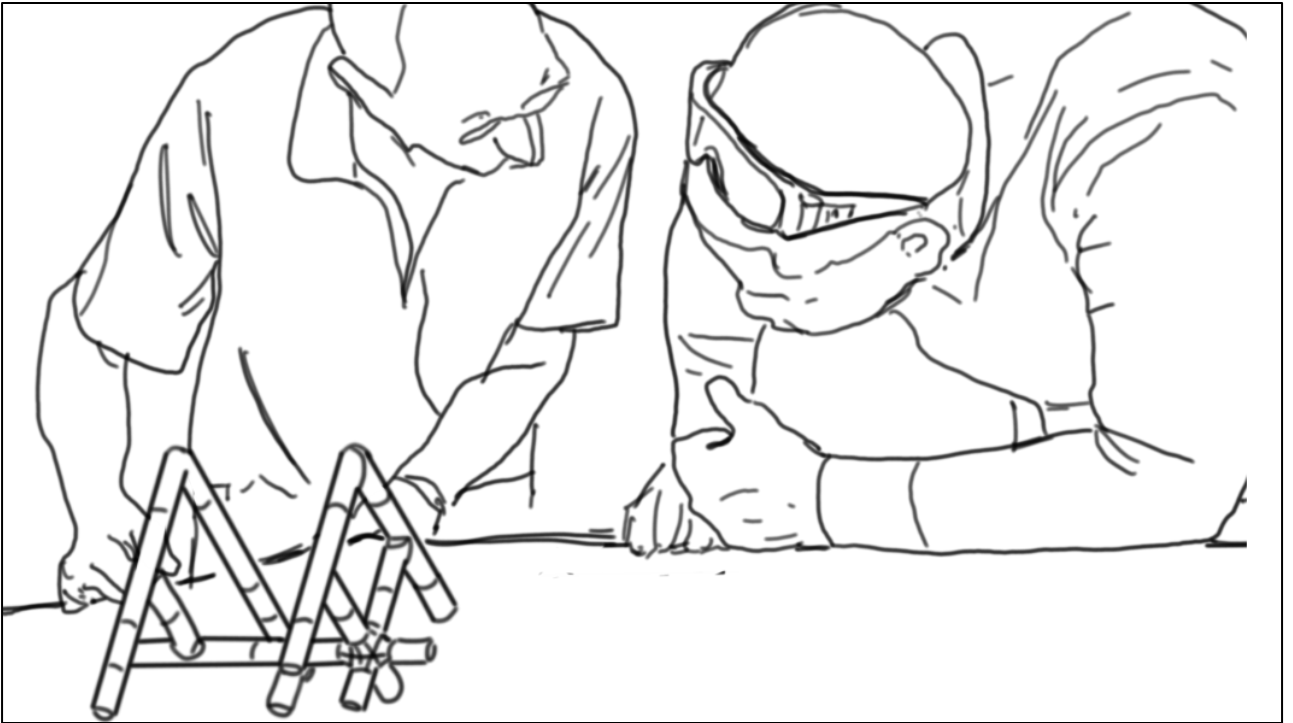
-Another nextfab member introduction: Another member is
making something with Geometer downstairs and after ___
asks about it, gets invited to help. They find it kind of
fun, and surprisingly easy!
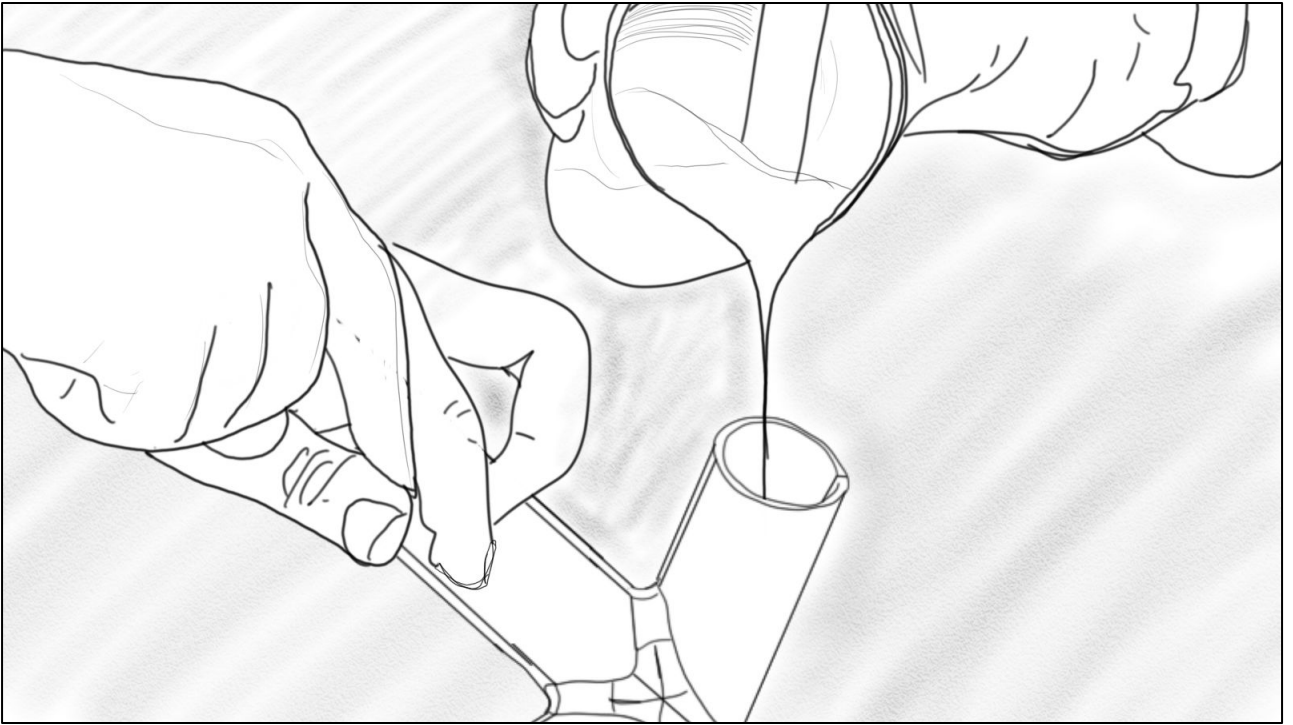
-Finished example: <removing mold casing, exposing the finished design) The artifact ____ helped build is done and pretty cool, ____ feels a kind of satisfaction for having helped and decides it's time to make something of their own.
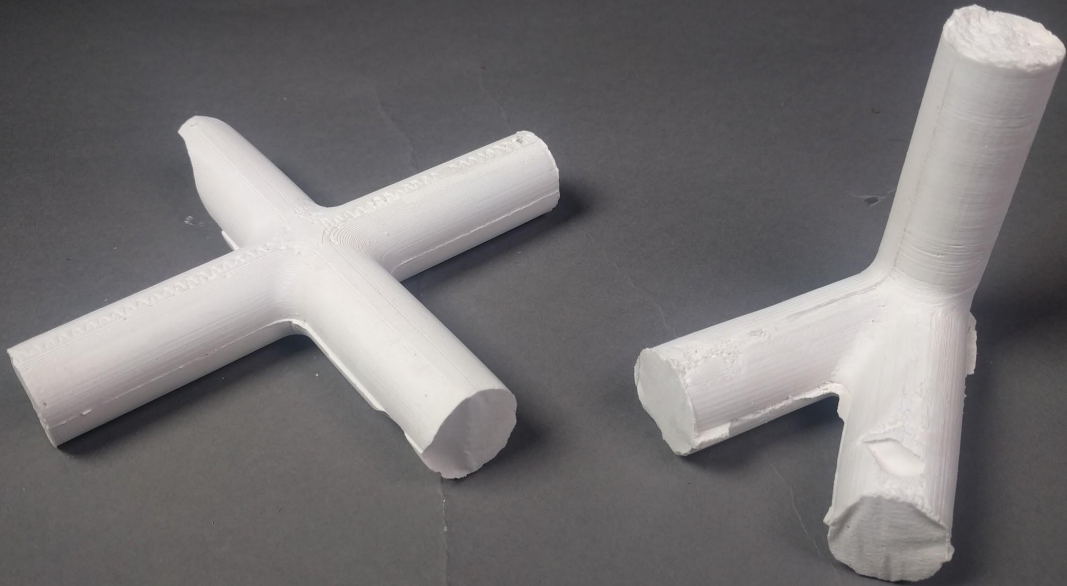
Mycelium:

Concrete:

Hydrocal:

Making Assemblies

Show how molds connect to reproduce a design assemblies are made using stainless steel clamps to provide stong, adjustable uniform pressure
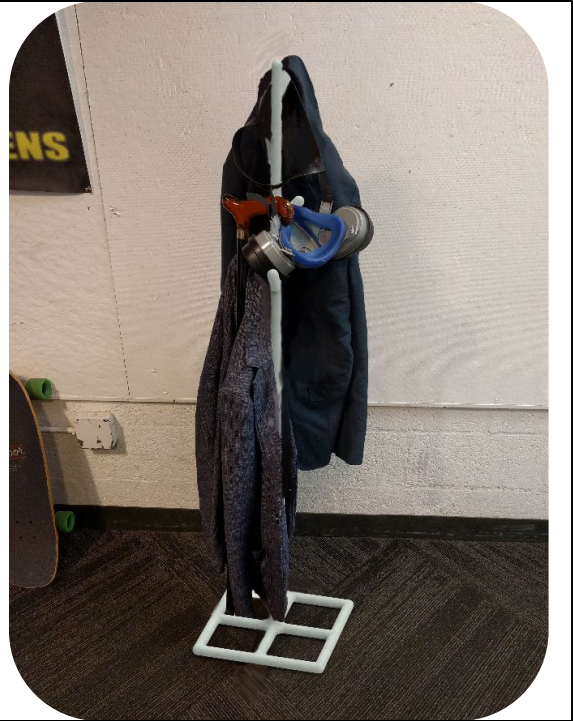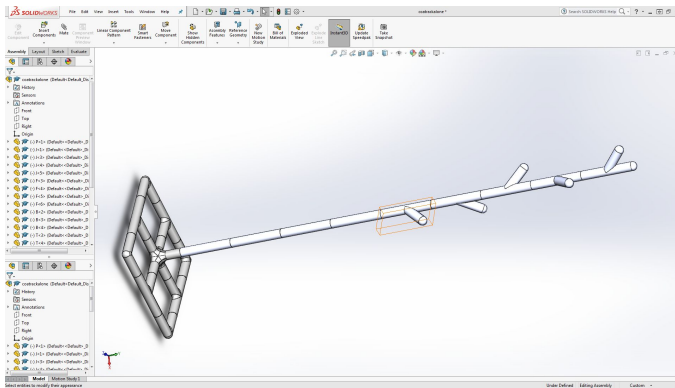
Disassembly

Show how molds connect to reproduce a design
-The reveal: _____ is excited an removes the molds on their lunch break after material is cured and is satisfied with their results! The rest is history, they start making more and more interesting things and start to learn lots of other skills along the way.

Skill Translation:

Skills translate easily to other practices and processes ensuring that as a users needs change their experiences retain value. It also makes it very convenient to make documentation open source so that anyone may try out geometer with minimal effort and adapt it as needed. This combination of features puts geometer in a class all its own; more than the novelty of 3D printing, more accessible than (sending it to the boys in china.) learning a specialized craft and far cheaper than conventional small scale manufacturing.

Thank You.