Talking with Robots about Architecture

Pragmatic applications of automation for AECO

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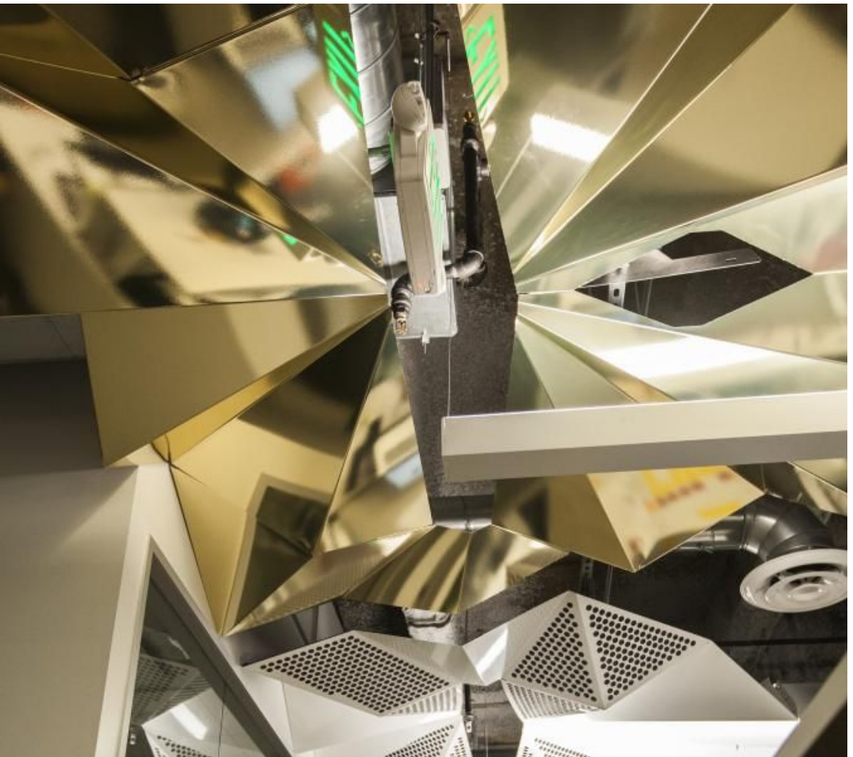
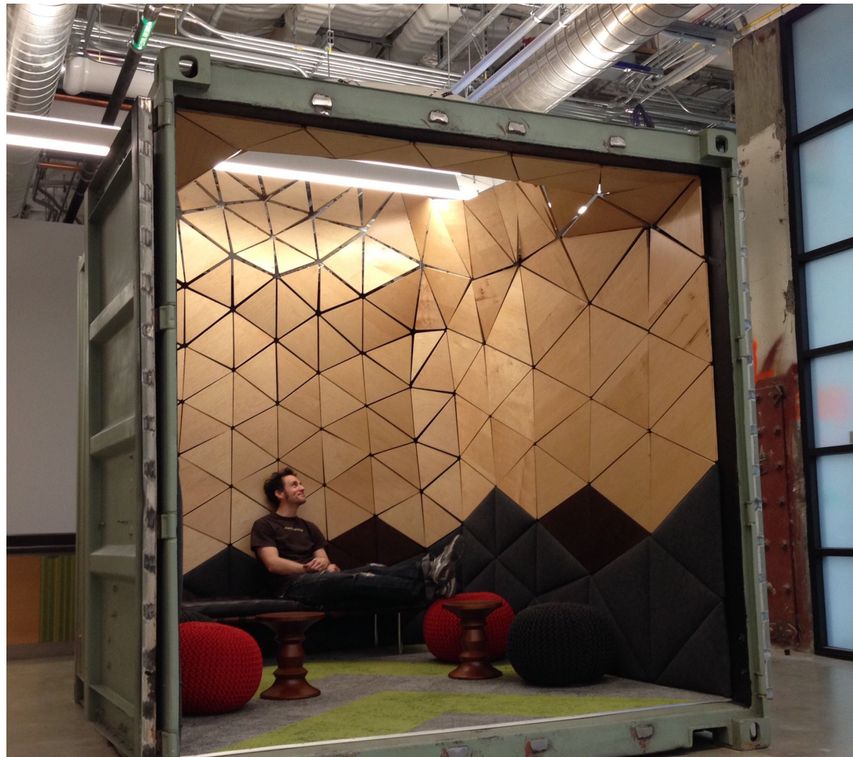
Architect & Founder, Because We Can

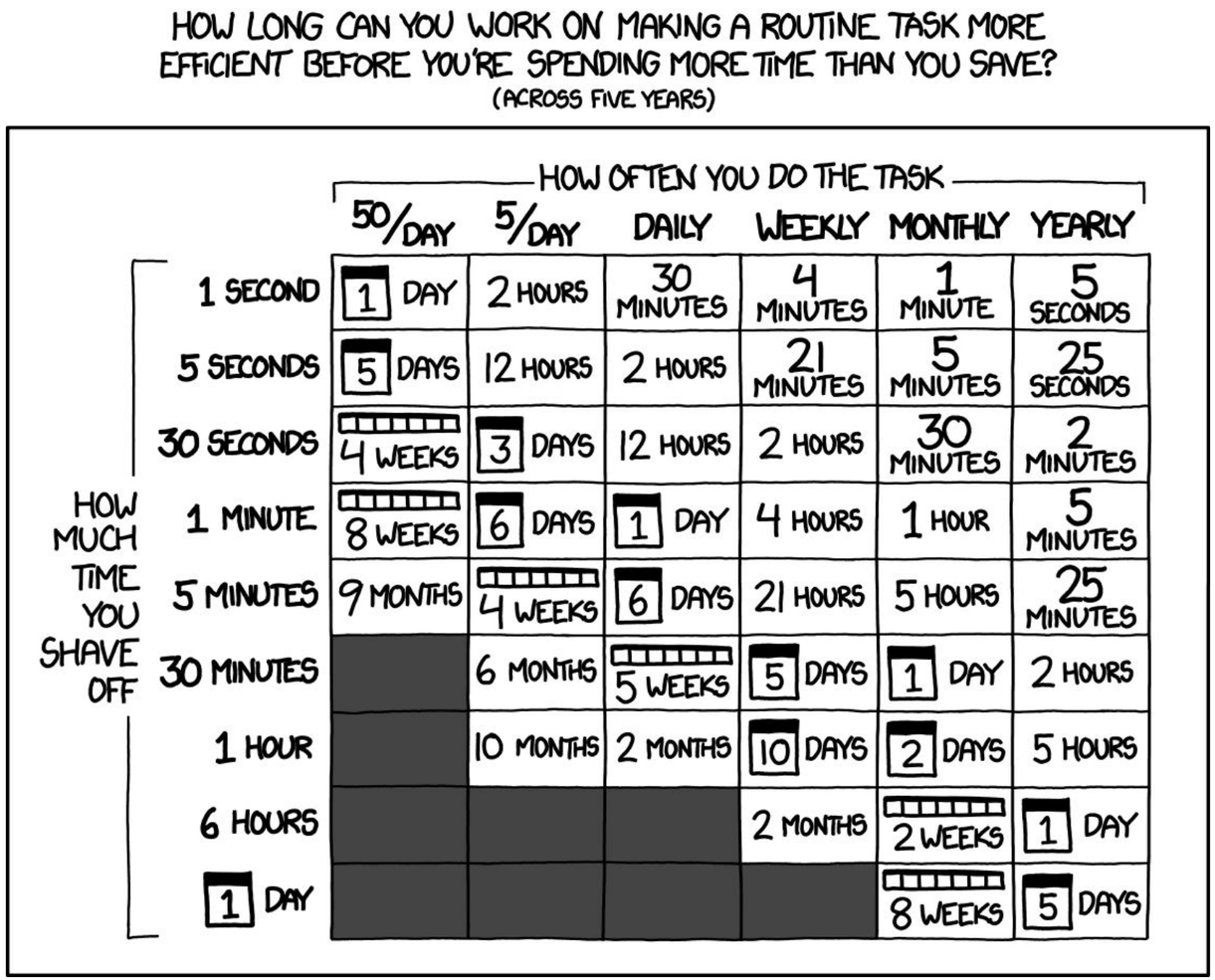

BECAUSE
WE
CAN
GMFanuc Robotics S-500
FANUC





Automation is Awesome

- Automation is:
  - *Empowering*
  - *Interesting*
  - *Exciting*
  - *Profitable*

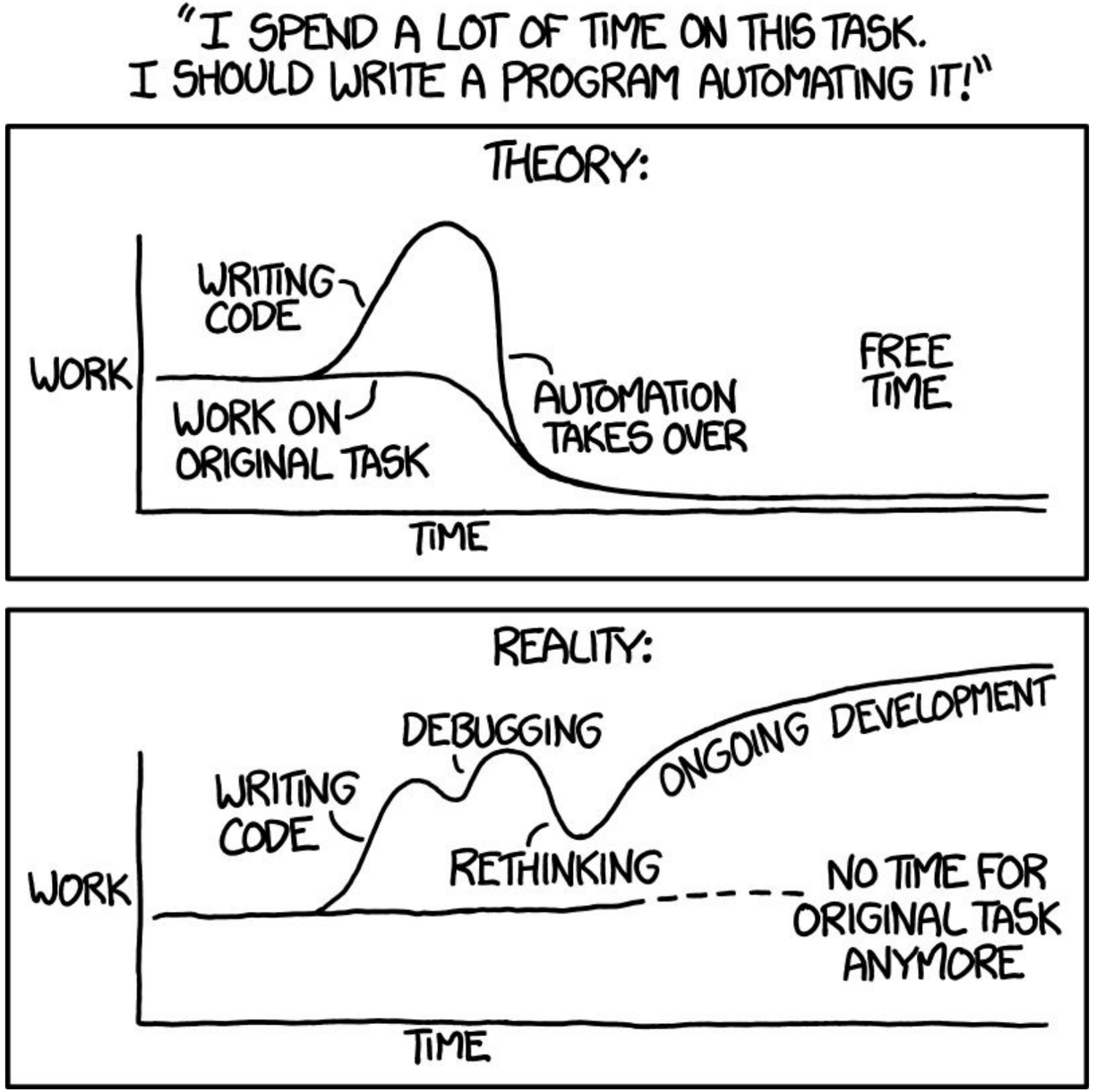


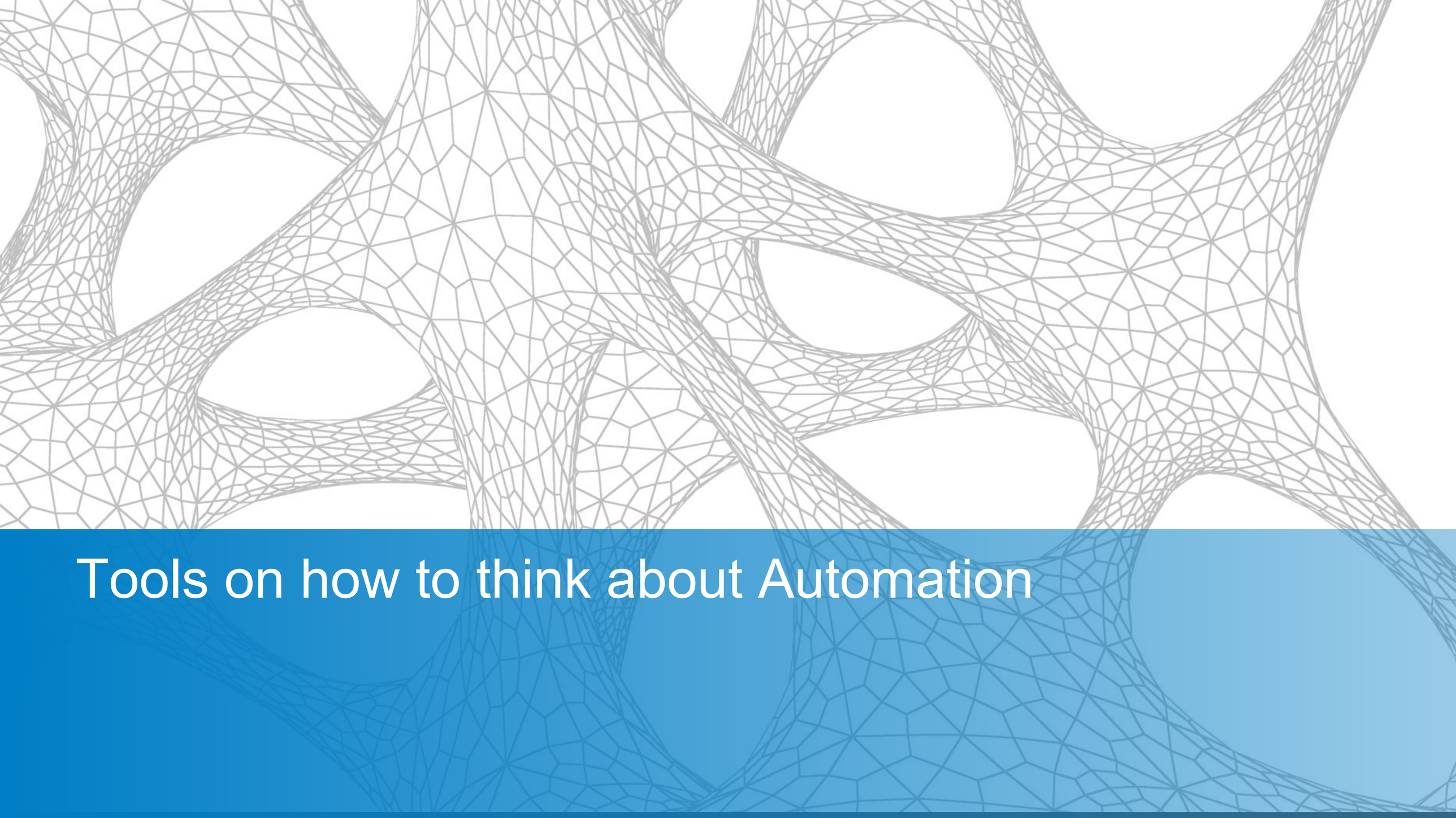
Automation is Terrible

- Automation is:
  - *Expensive*
  - *Difficult*
  - *Fragile*
  - *Disruptive*

...It's all about

Created Value.

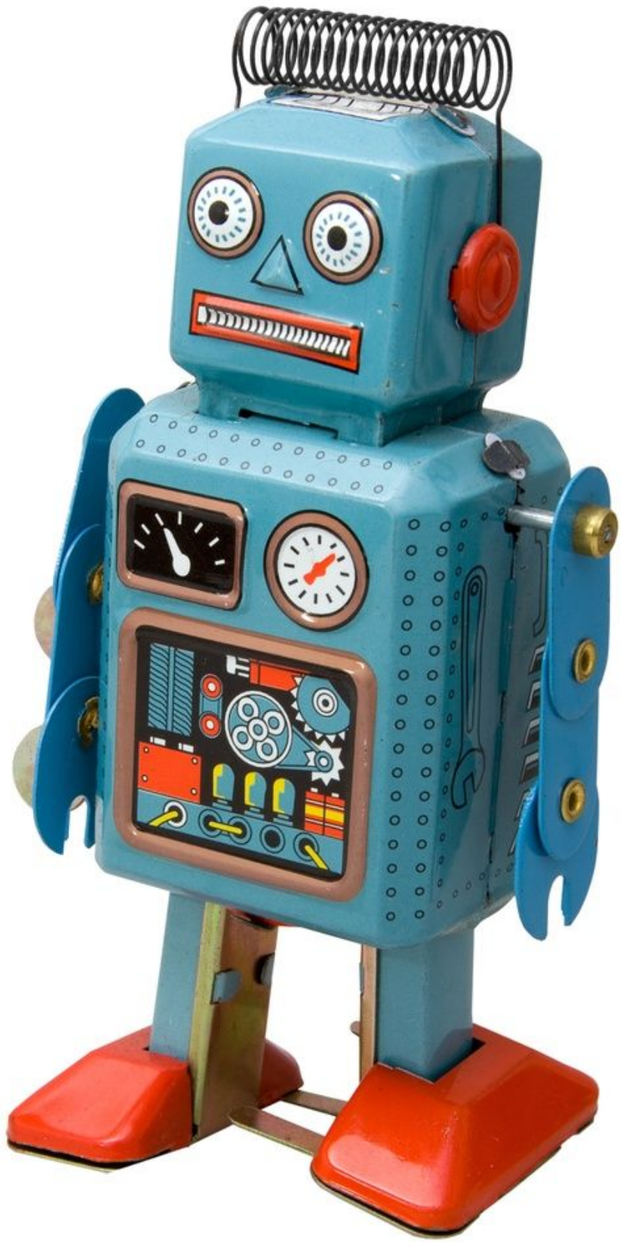




Tools on how to think about Automation

Four Types of Automation

- **Type One**: *Same Job, Only Cheaper*
- **Type Two**: *Automation Does It Better*
- **Type Three**: *Automation Makes It Easy*
- **Type Four:** *Automation Makes It Possible*



Type One: Same Job, Only Cheaper

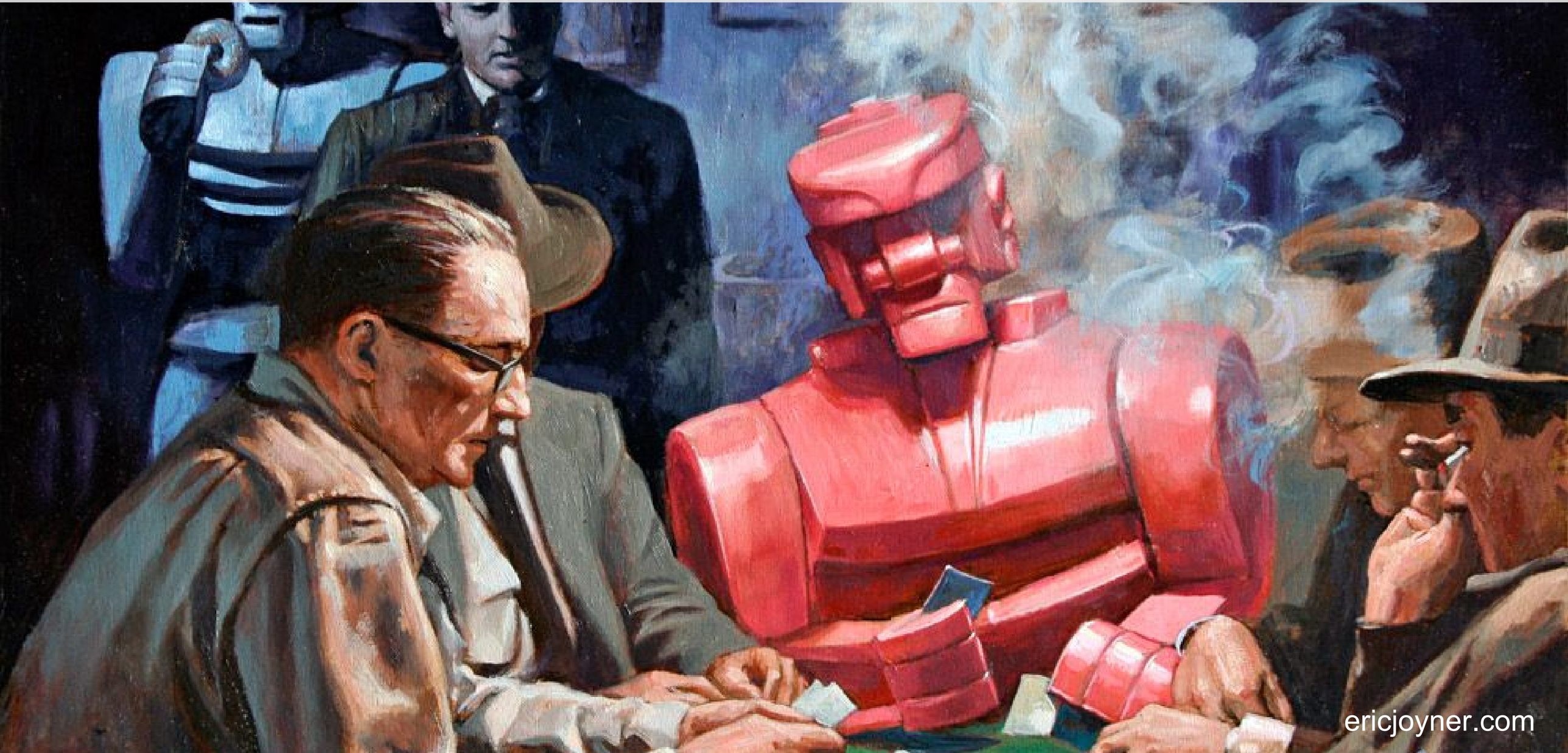
Type One: Basic Scripting

- Macros, Dynamo, LISP of old...
- Automating simple repetitive tasks.
- Lets you do more and/or frees up skilled people to work on higher-value tasks.
- It’s best to use whatever language is the most productive to build in & maintain.
- Isn’t much difference between a worker vs. a script, other than the script *could* be faster.

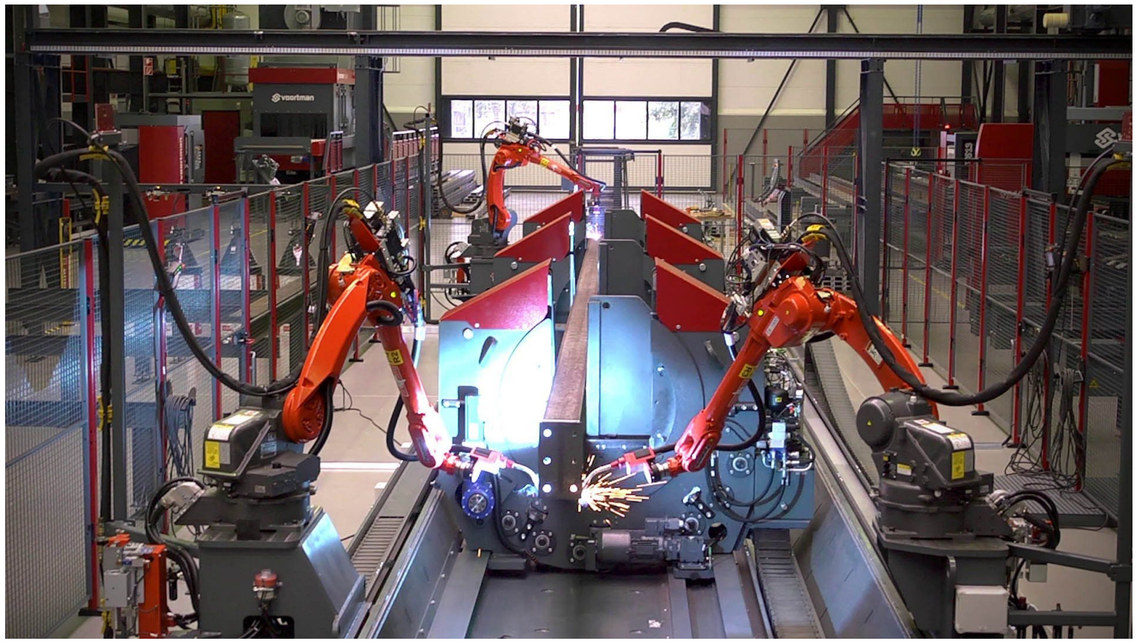
Type One: Automated Saw Stops

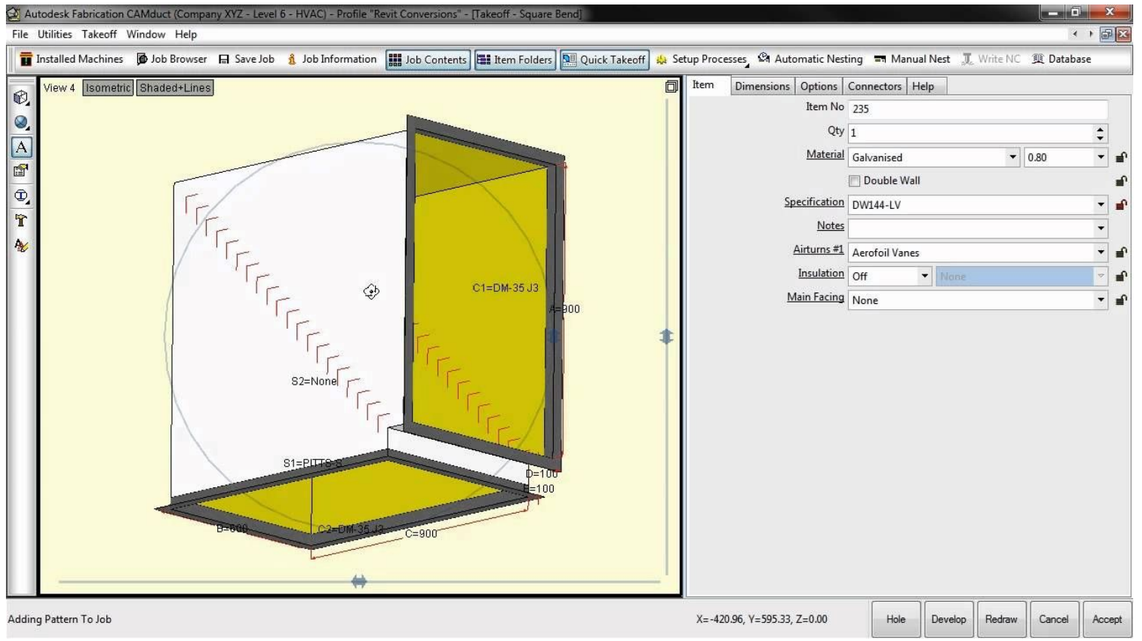
- Automated stops for cutting lengths,
- Can be linked to BOM, CAD, or direct input.
- While cool, it’s really not doing anything a skilled fabricator can’t do on their own, and it doesn’t save *that* much time in all use cases.
- GIGO and over-reliance a problem too!

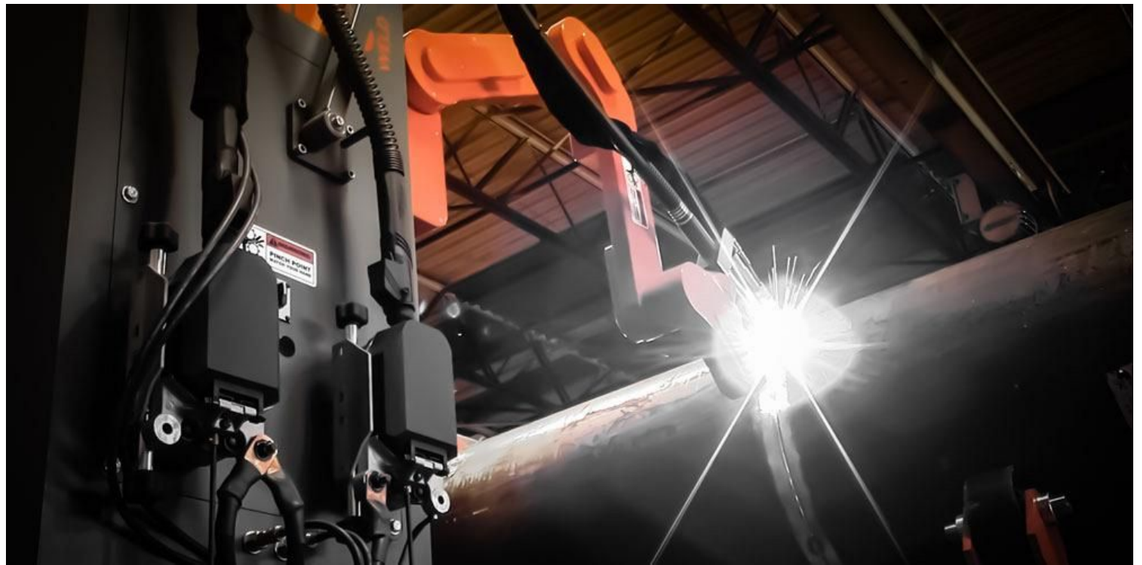
Type Two: Automation Does it Better

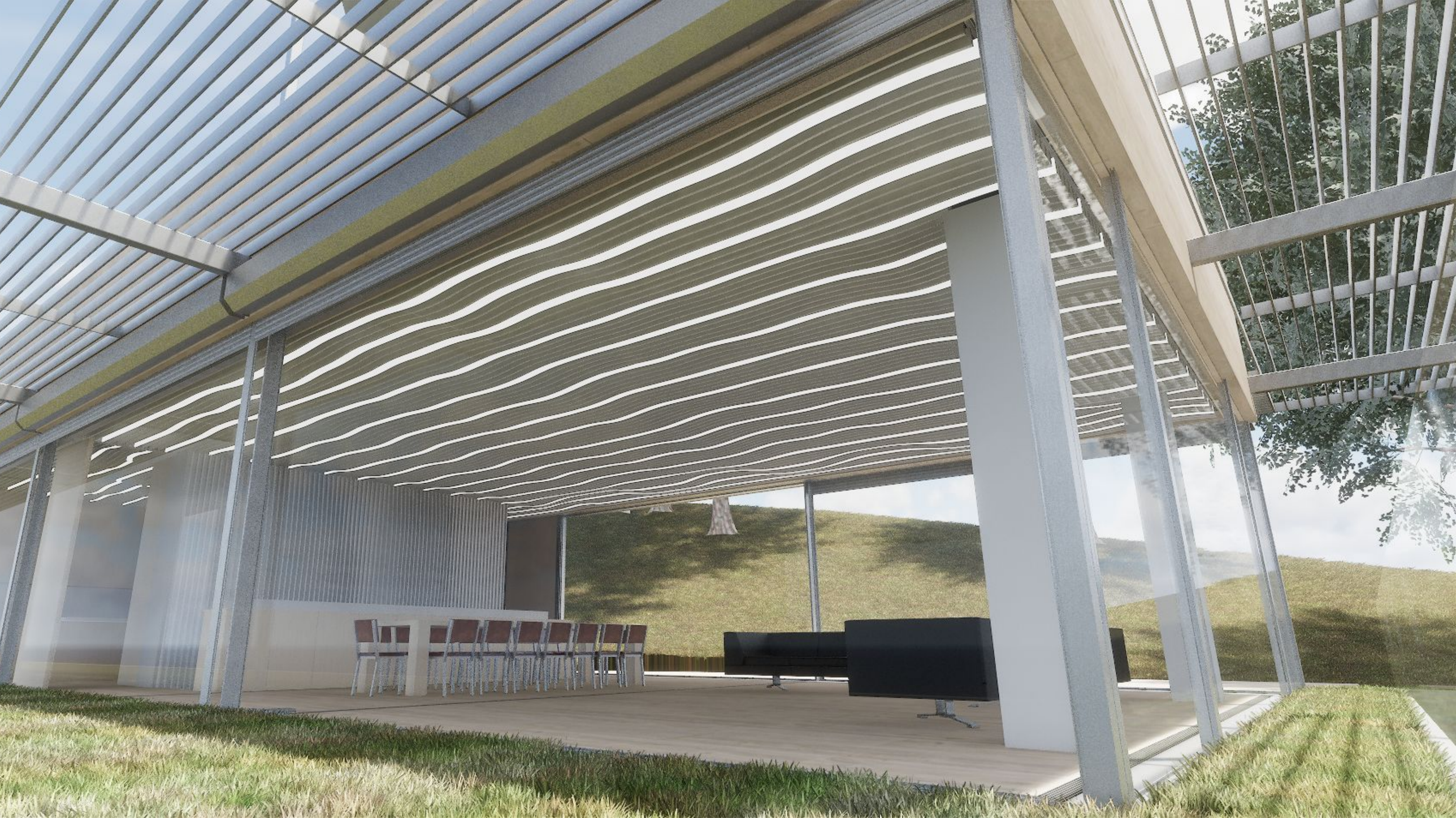


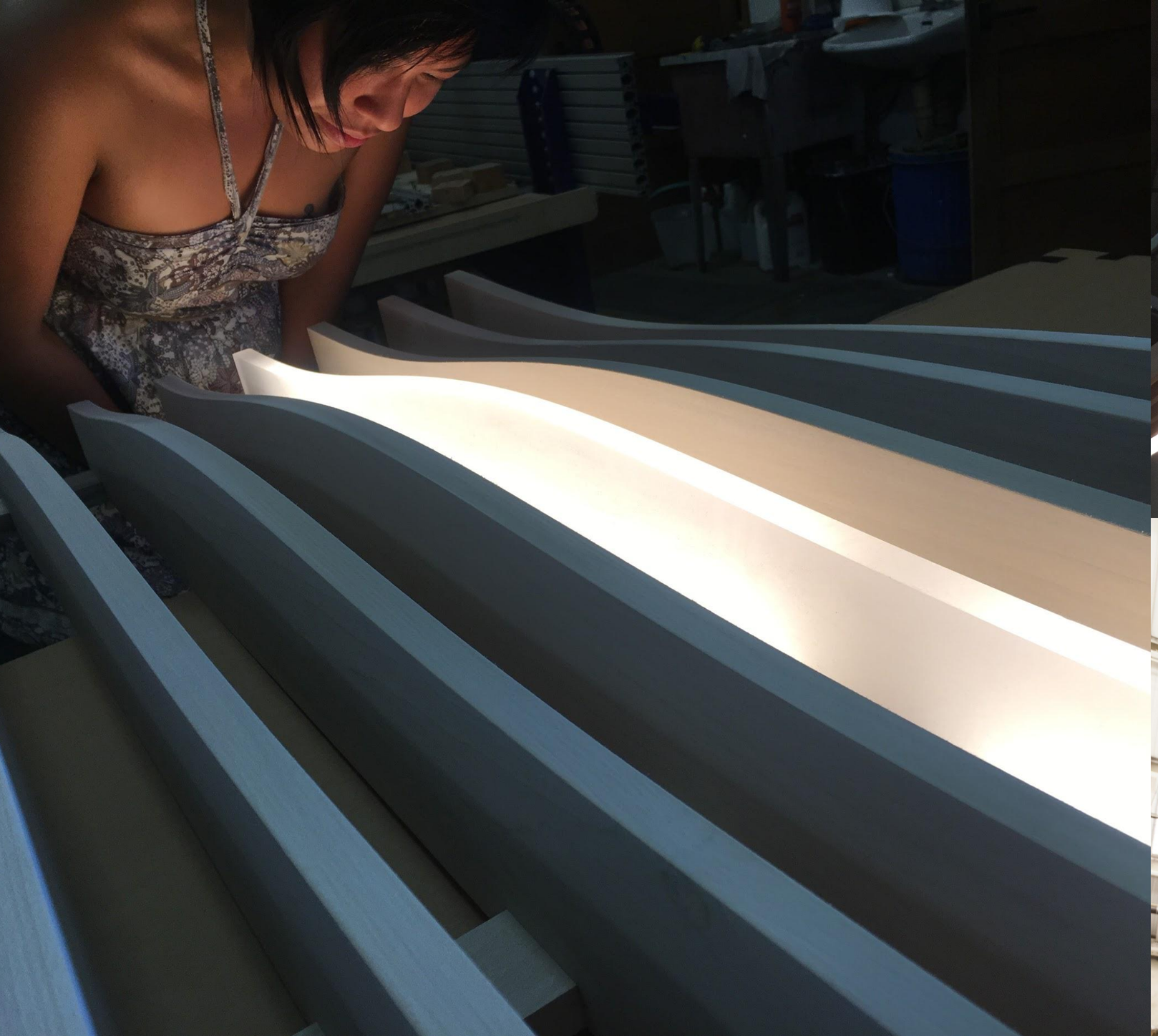
Type Two: BIM - to - Fabrication











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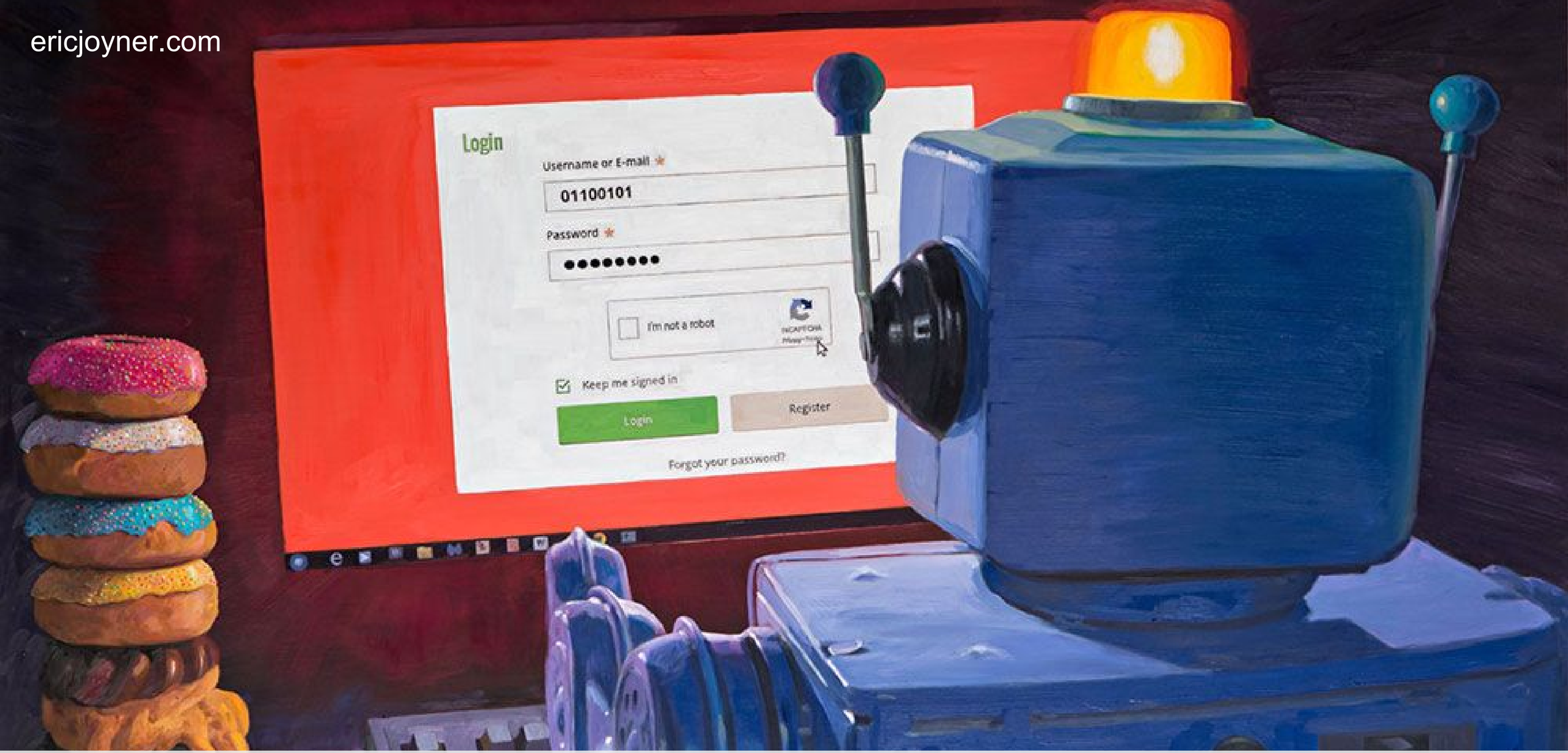
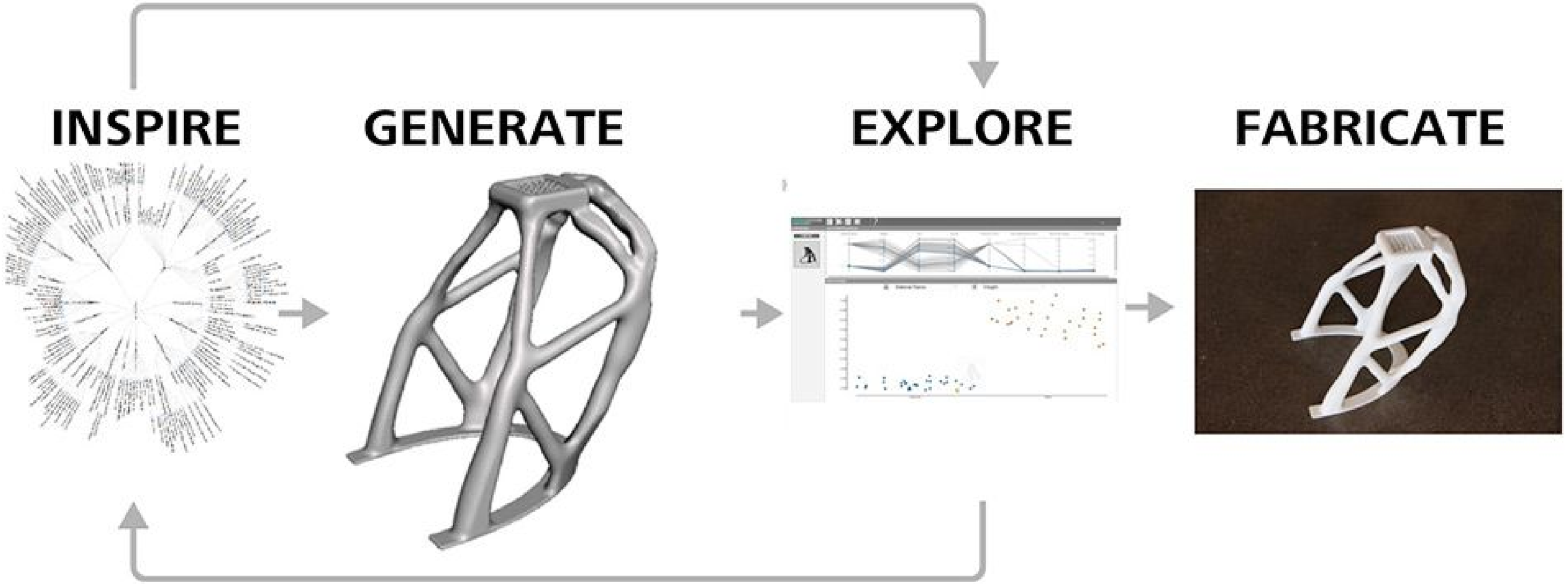
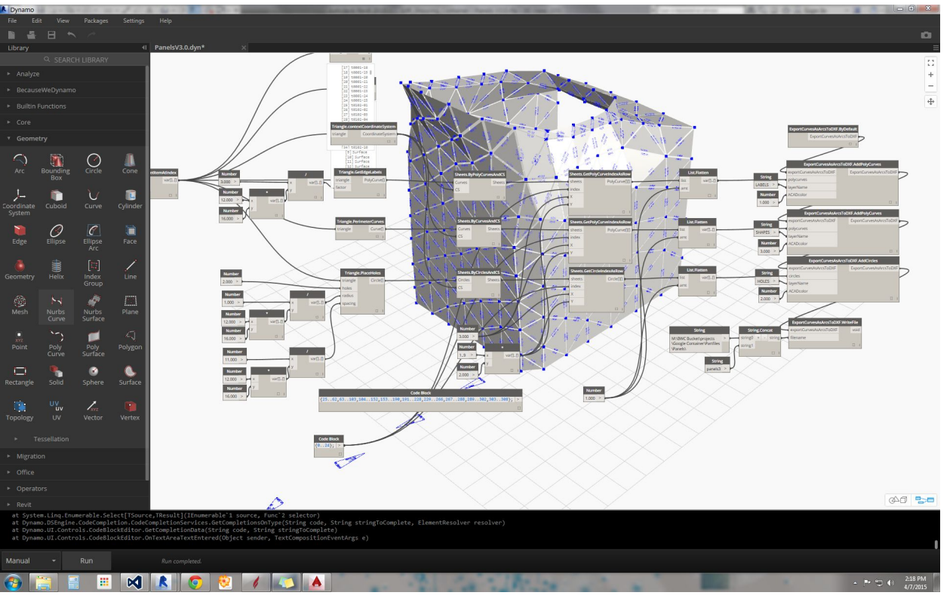


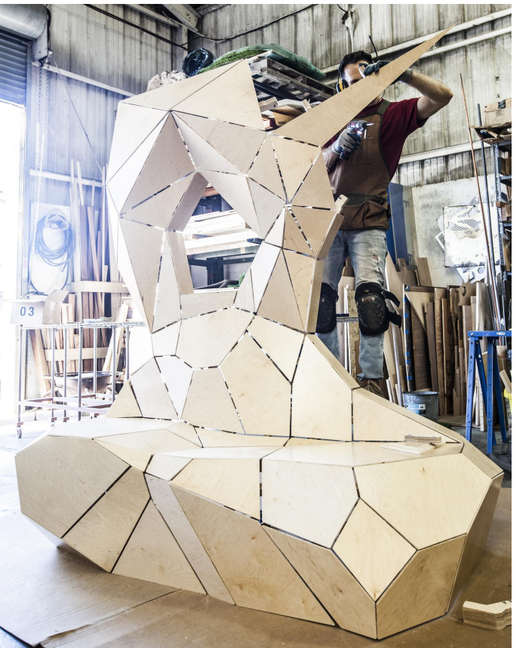
Type Three: Automation makes it Easy

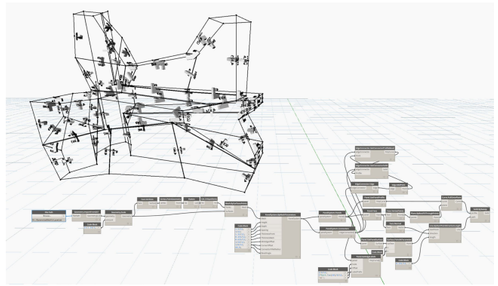
Type Three: Generative Design



Type Three: Dynamo for Digital Fabrication



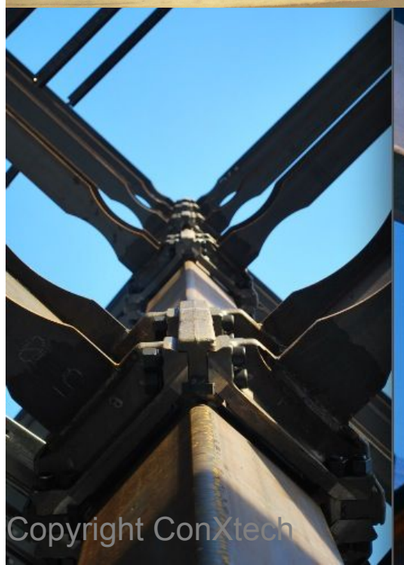




Type Four: Automation Makes it even **Possible**

Type Four: ConXtech

- Clever steel moment-frame system.
- Heavily automated from design to production to installation.
- Had to build own test frames to prove system worked, & had to write it’s own plug-ins for lots of different 3D / MCAD / BIM platforms.
- Whole business is aligned to semi-automated production of structural frames.

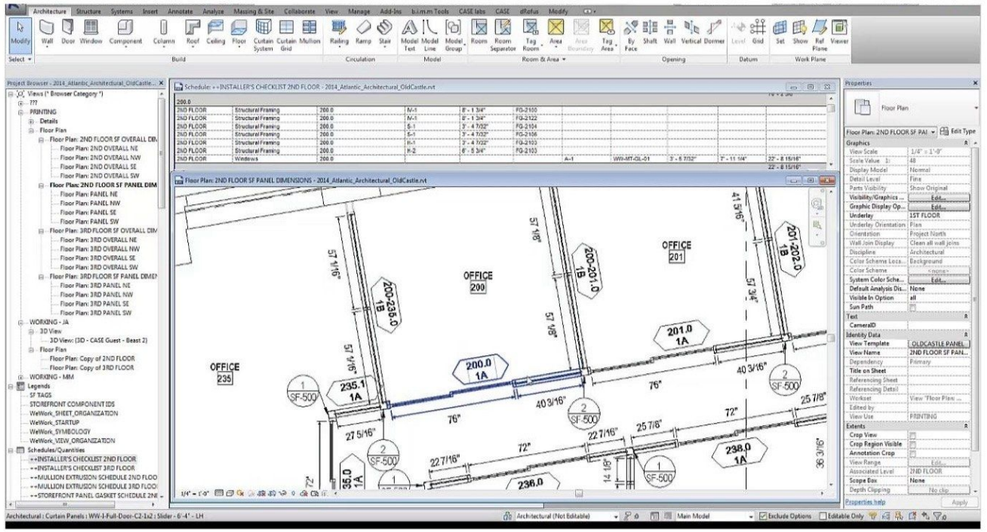


WeWork

- Very successful world-wide CoWorking company
- Heavily automating the design and construction of office space to reduce build-out costs
- Using automation to reduce operational costs via live data collection of users and spaces

FABRICATION DOCUMENTATION

Direct to fabrication workflows for our interior storefront packages



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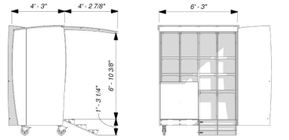
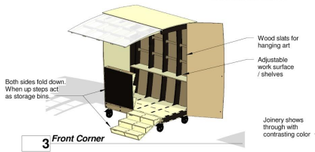
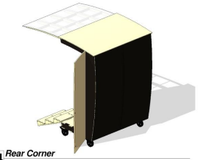


2 **Left**
1/4" = 1'-0"

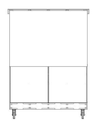
1 **Front**
1/4" = 1'-0"



3 **Front Corner**



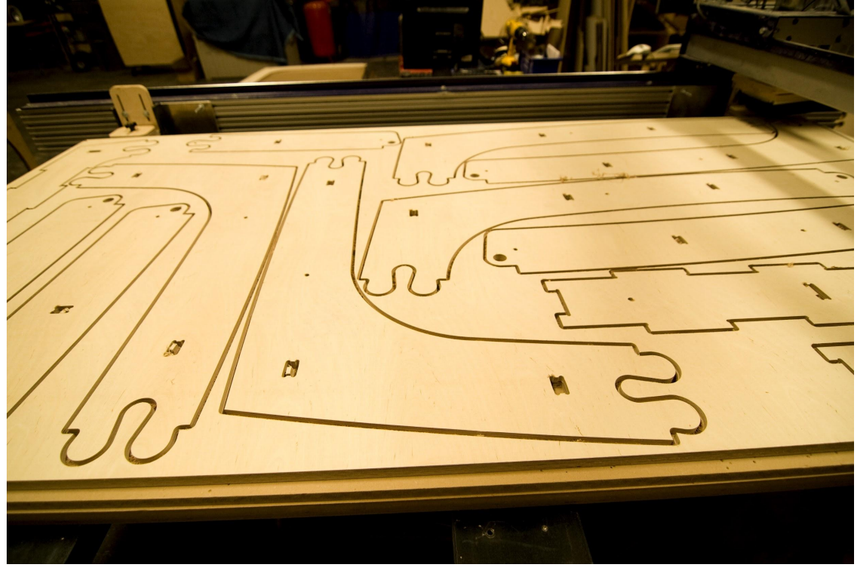
4 **Rear Corner**

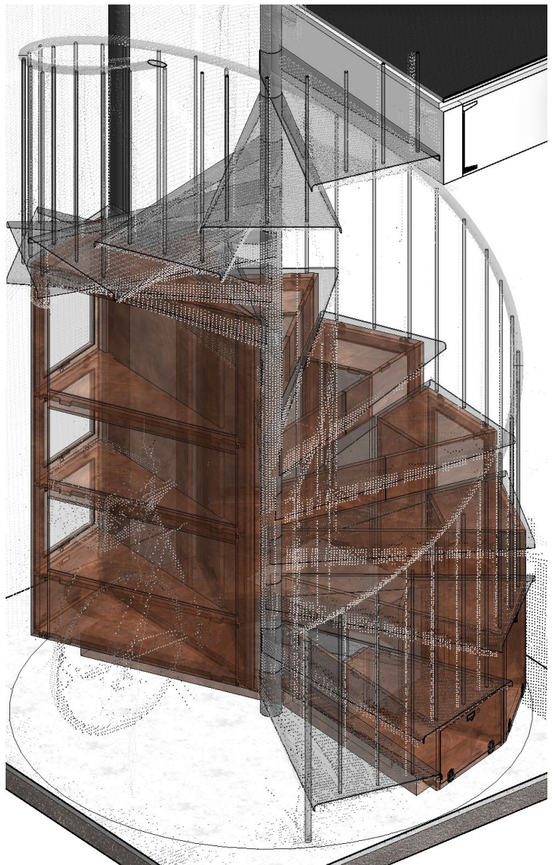


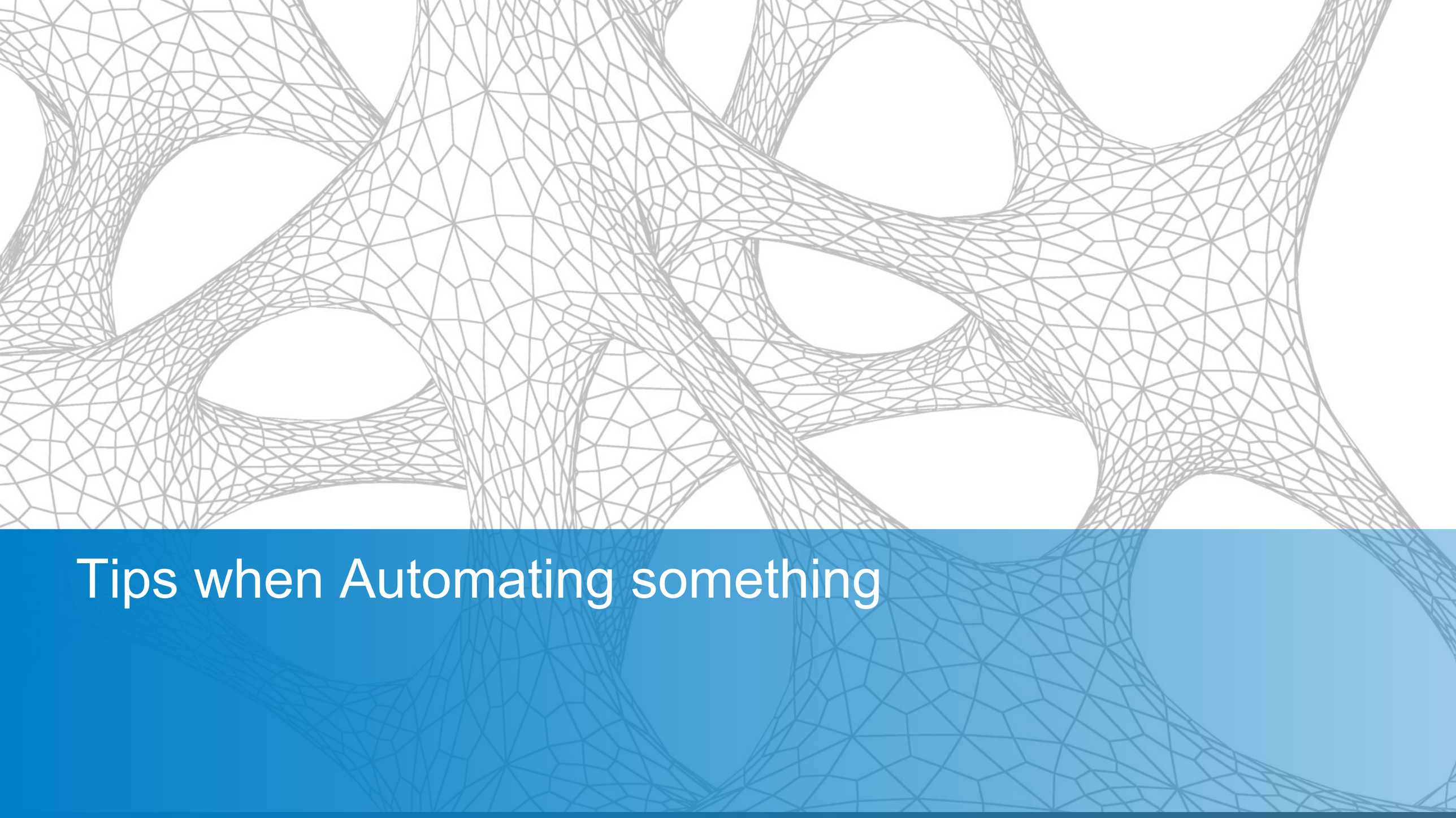
Anno Domini
Because We Can, LLC 2500 Kirkham St. (510) 922-8846 www.becausewecan.org

nomAD

09/03/10 1/4" = 1'-0" 1







Tips when Automating something

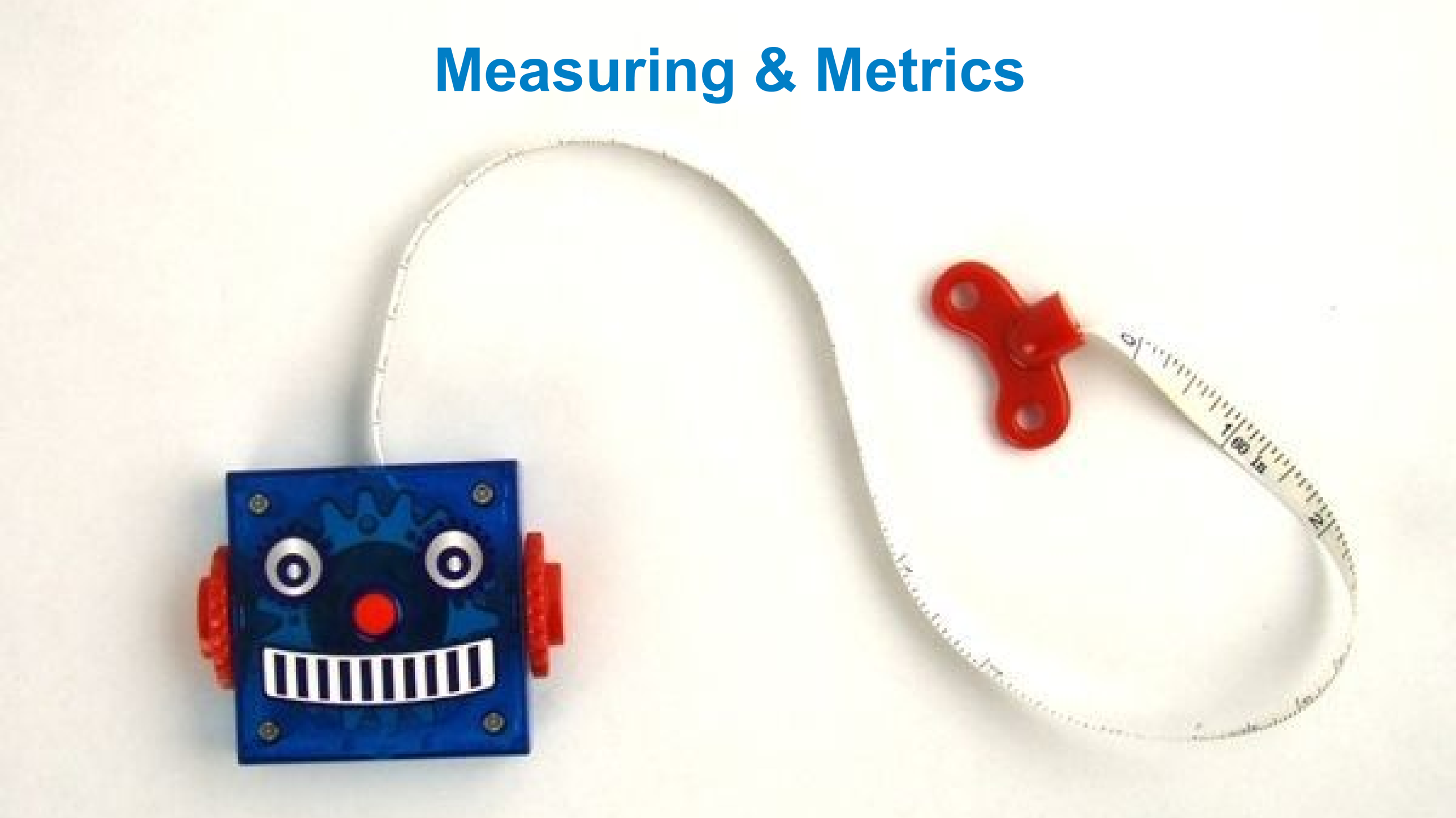
Handle

Body

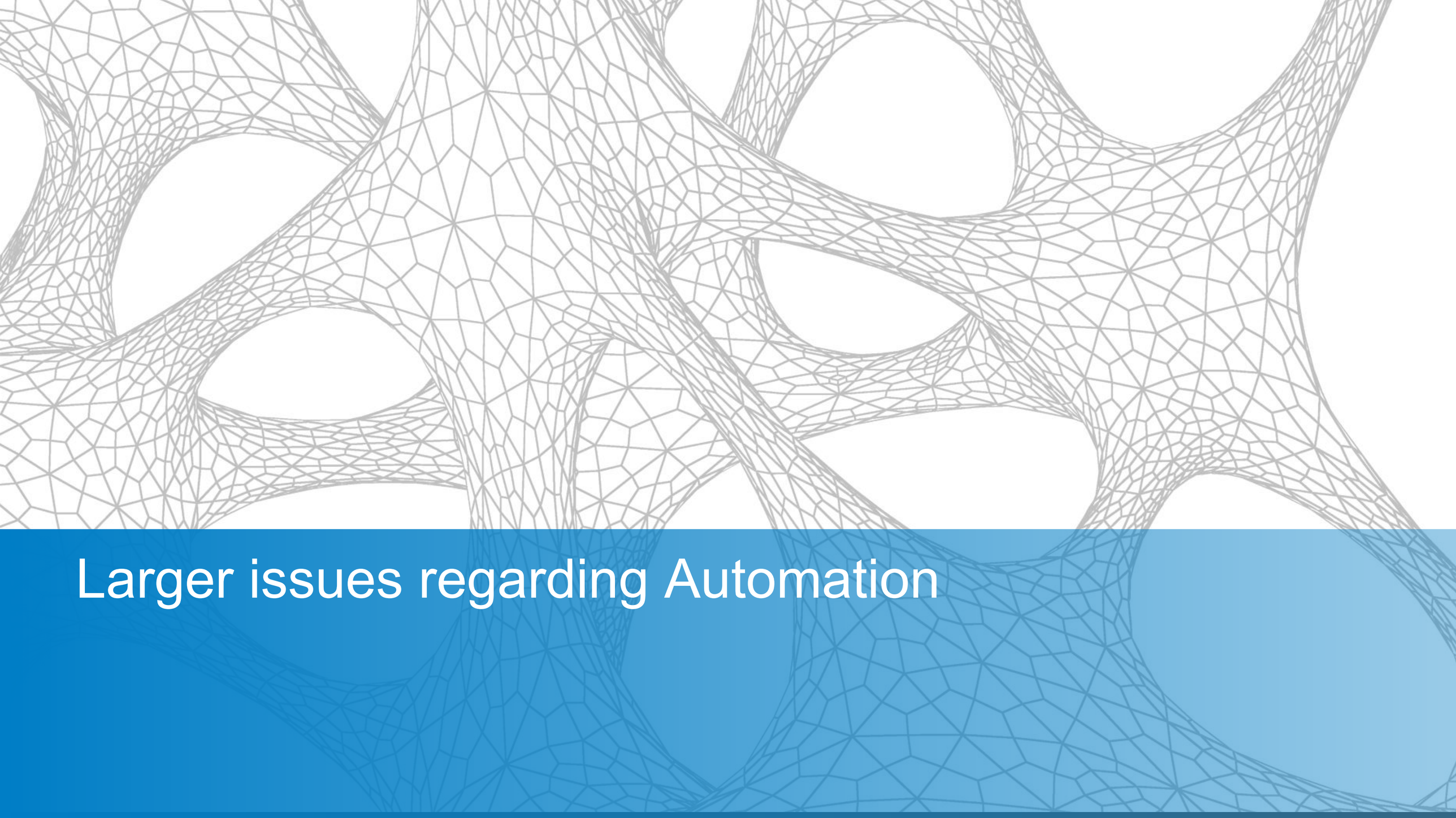
Tip

Automation is just a tool

Measuring & Metrics



Technical Debt

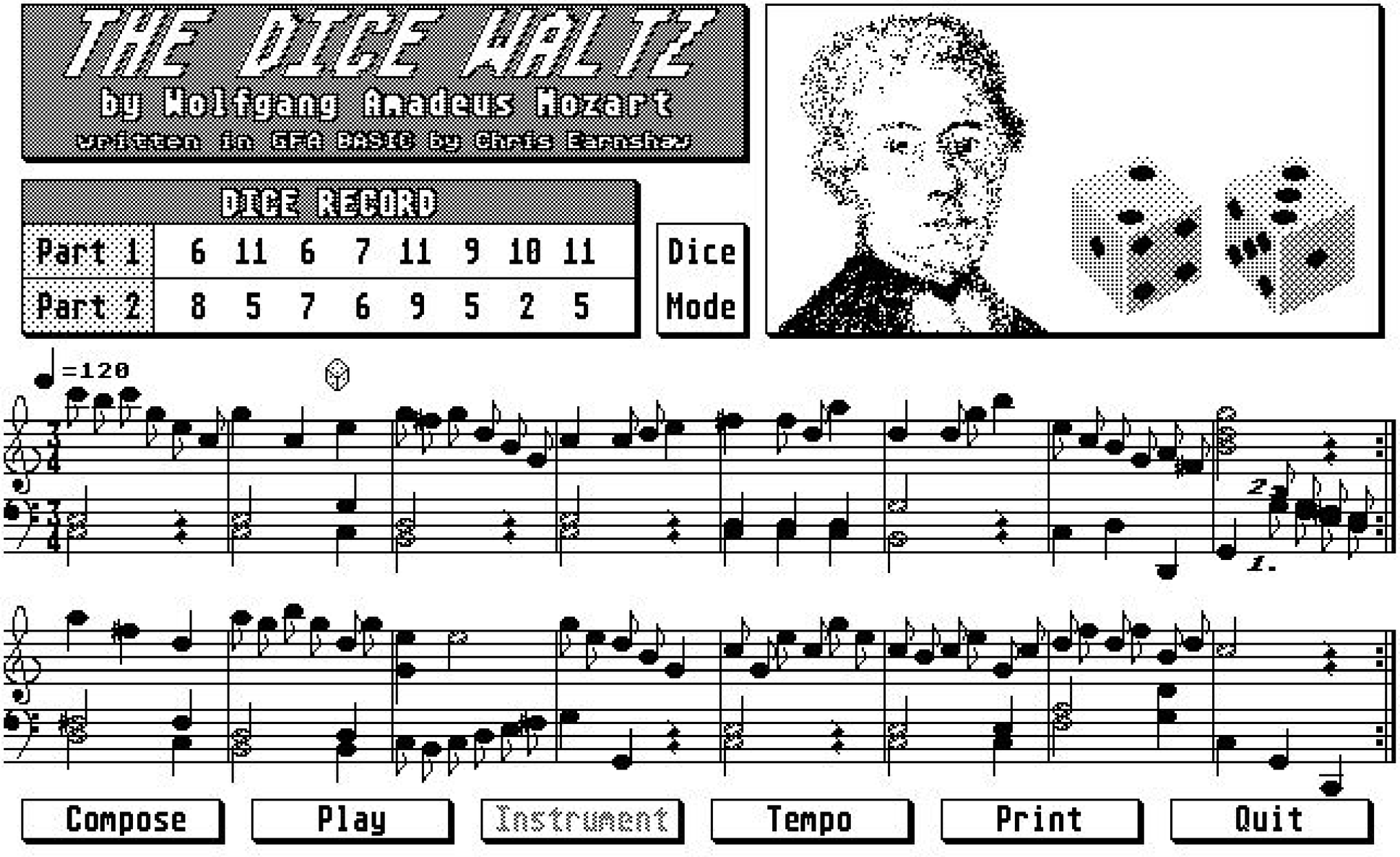


Larger issues regarding Automation

Automation is Fragile

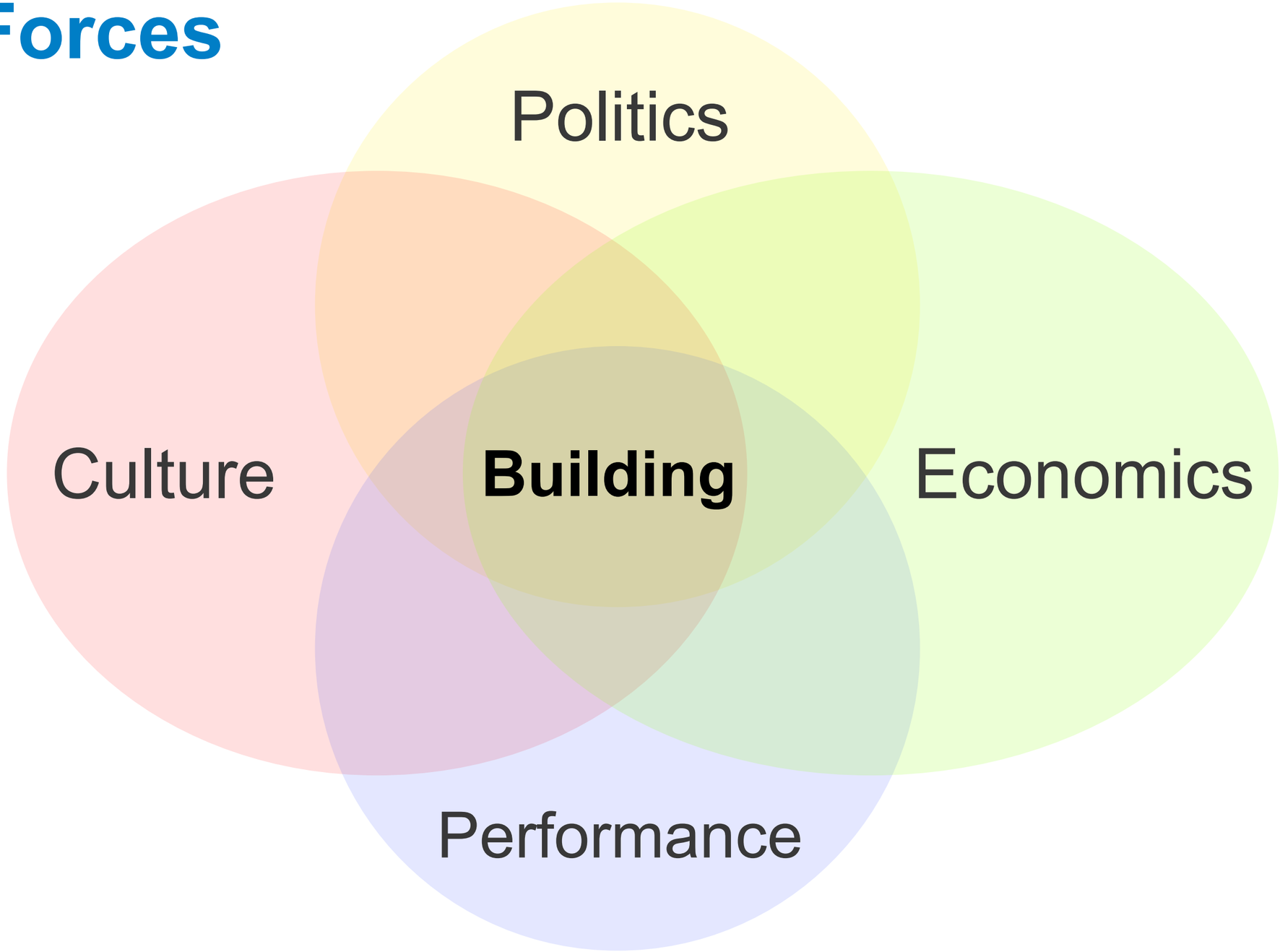
Automation is Stupid

Automation is Boring

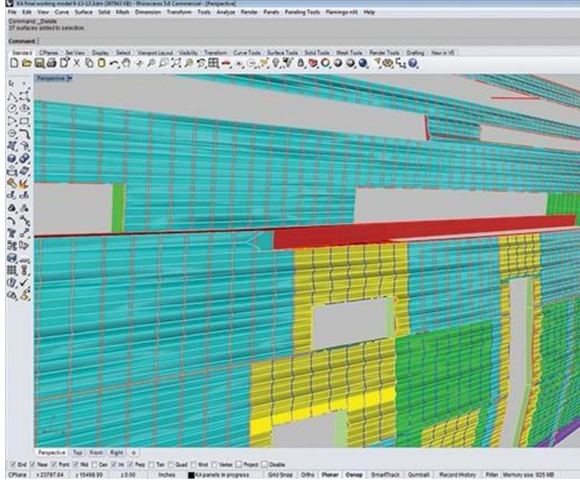


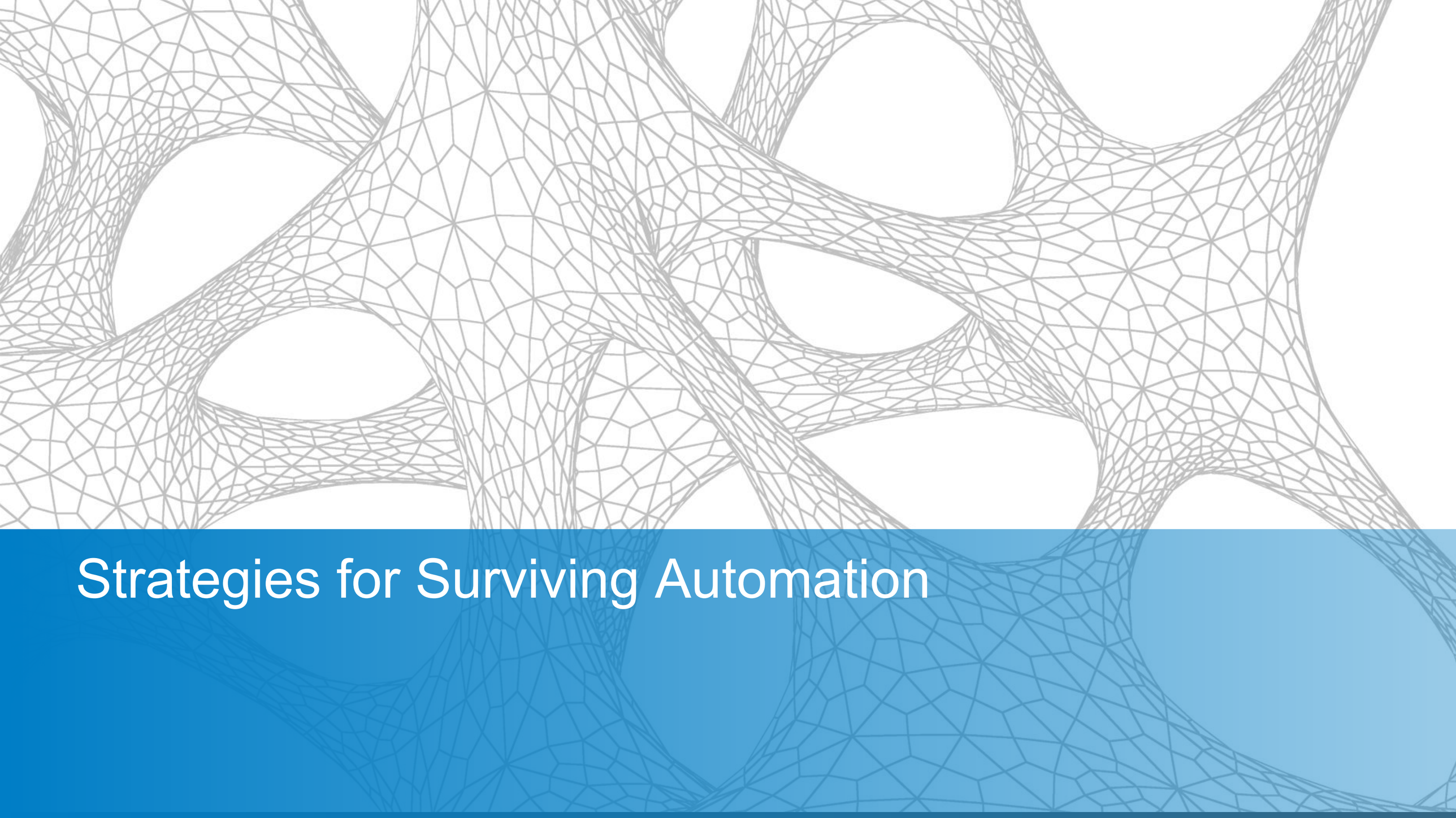
Buildings Aren’t Cars

Four Forces



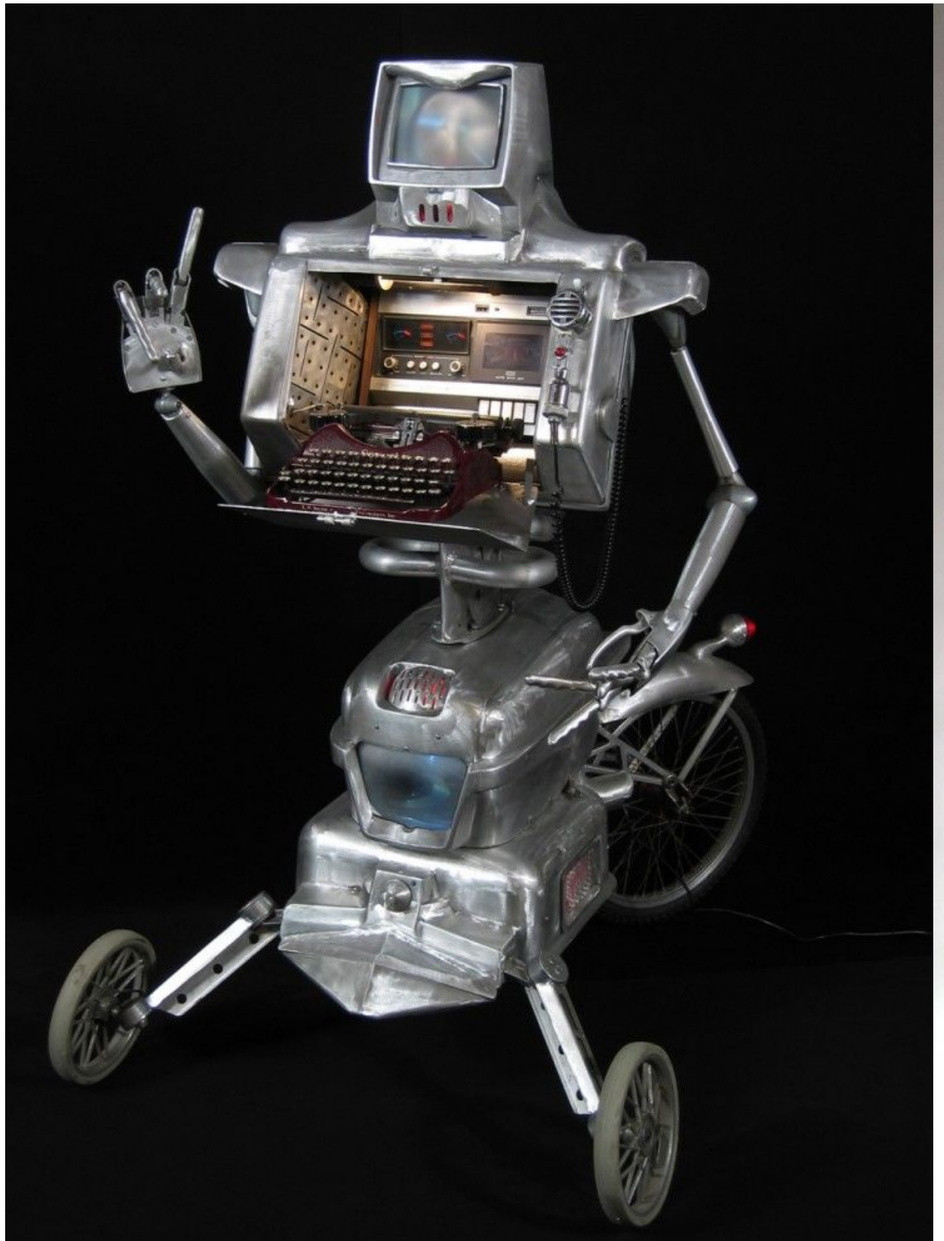
KREYSLER &
ASSOCIATES



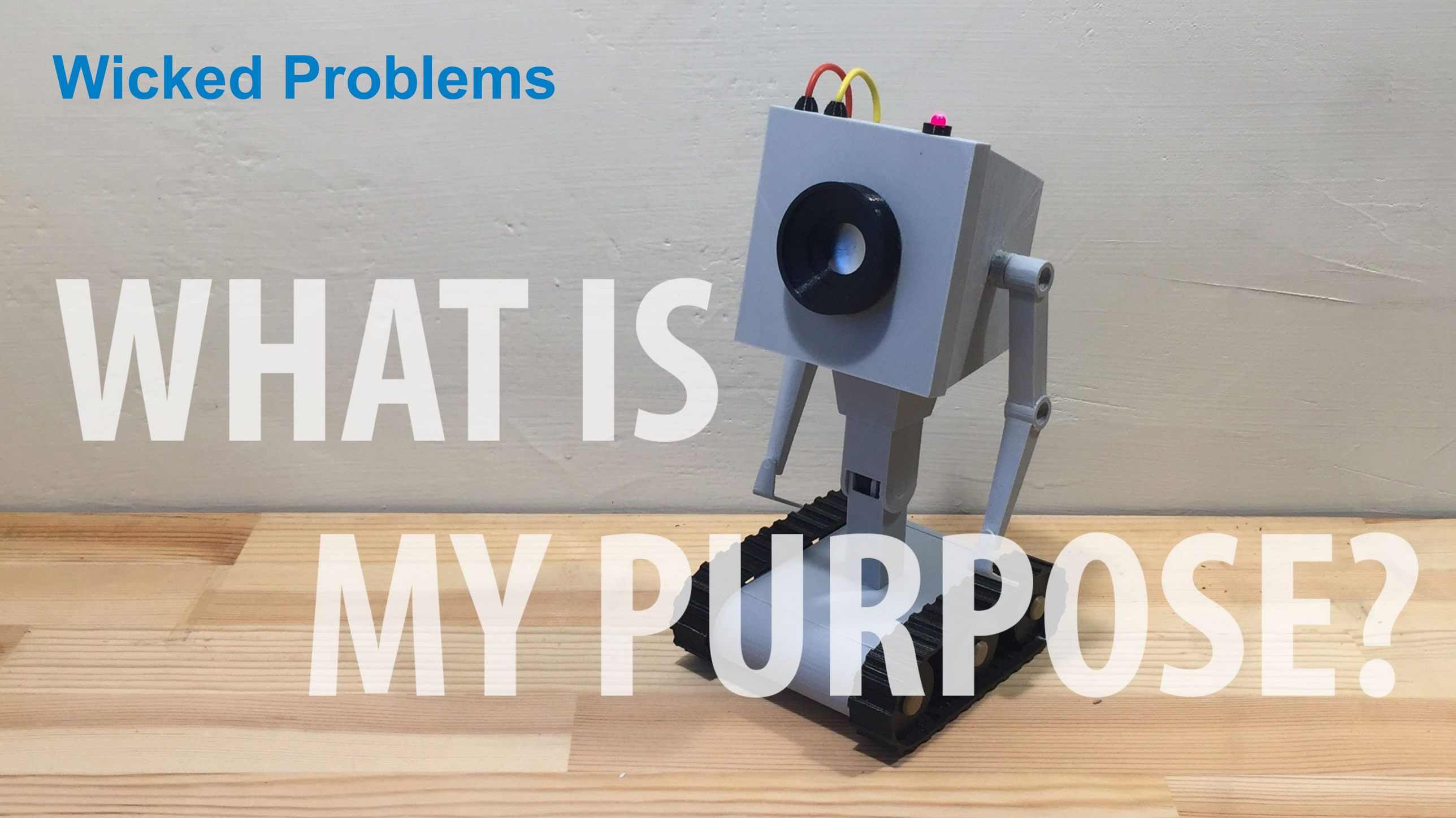


Strategies for Surviving Automation

Empowerment vs. Disempowerment



Wicked Problems



‘Soft Skills’ will rule

When robots make the ‘hard’ skills so easy anyone can do them, the ‘soft’ skills become more important.

- Creative business-focused value-adding
- Designing Systems
- Sales, Marketing, and Relationships
- Humanities, Attention-getting, and Cultural Understanding

Add these skills onto what you already do to stay relevant!

AUTODESK®

Make anything.