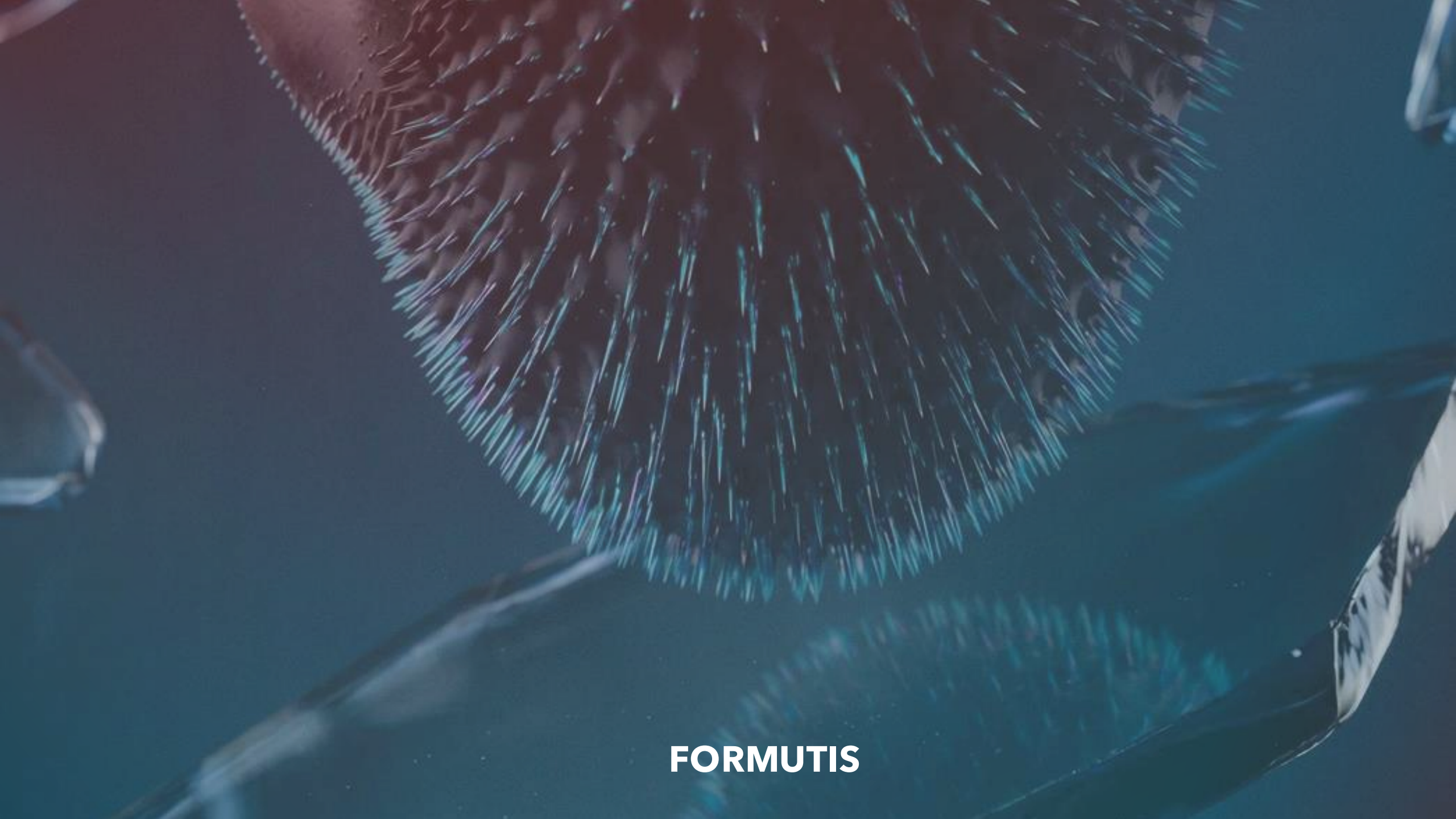

FORMUTIS

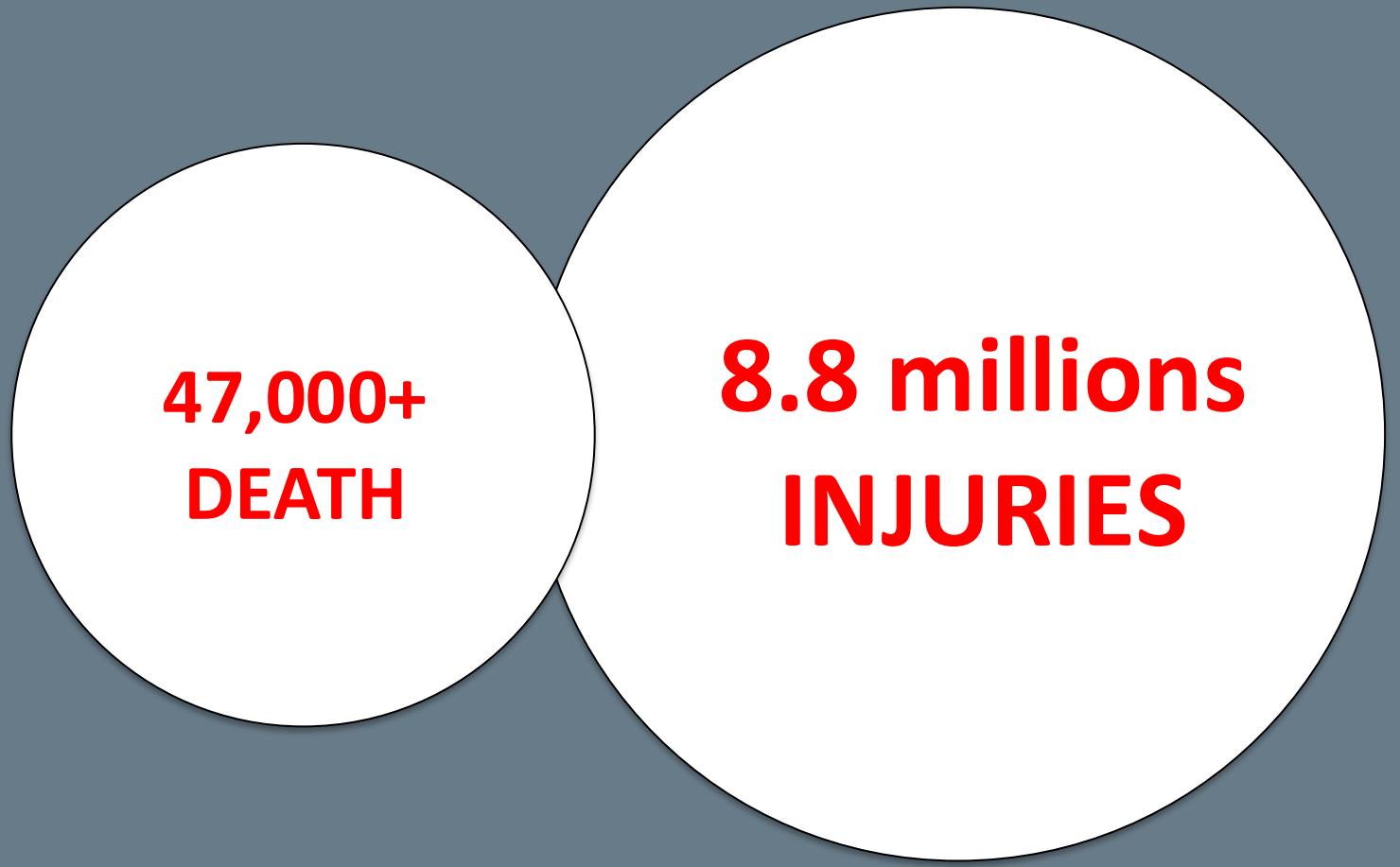
Whoever you are, slippery surfaces just don’t care



My Story – Our Story



In 2024, slippery surfaces caused



Source - National Safety Council — Slips, Trips and Falls

Who Gets Hurt & Market Size



Urban Commuters in cold climate

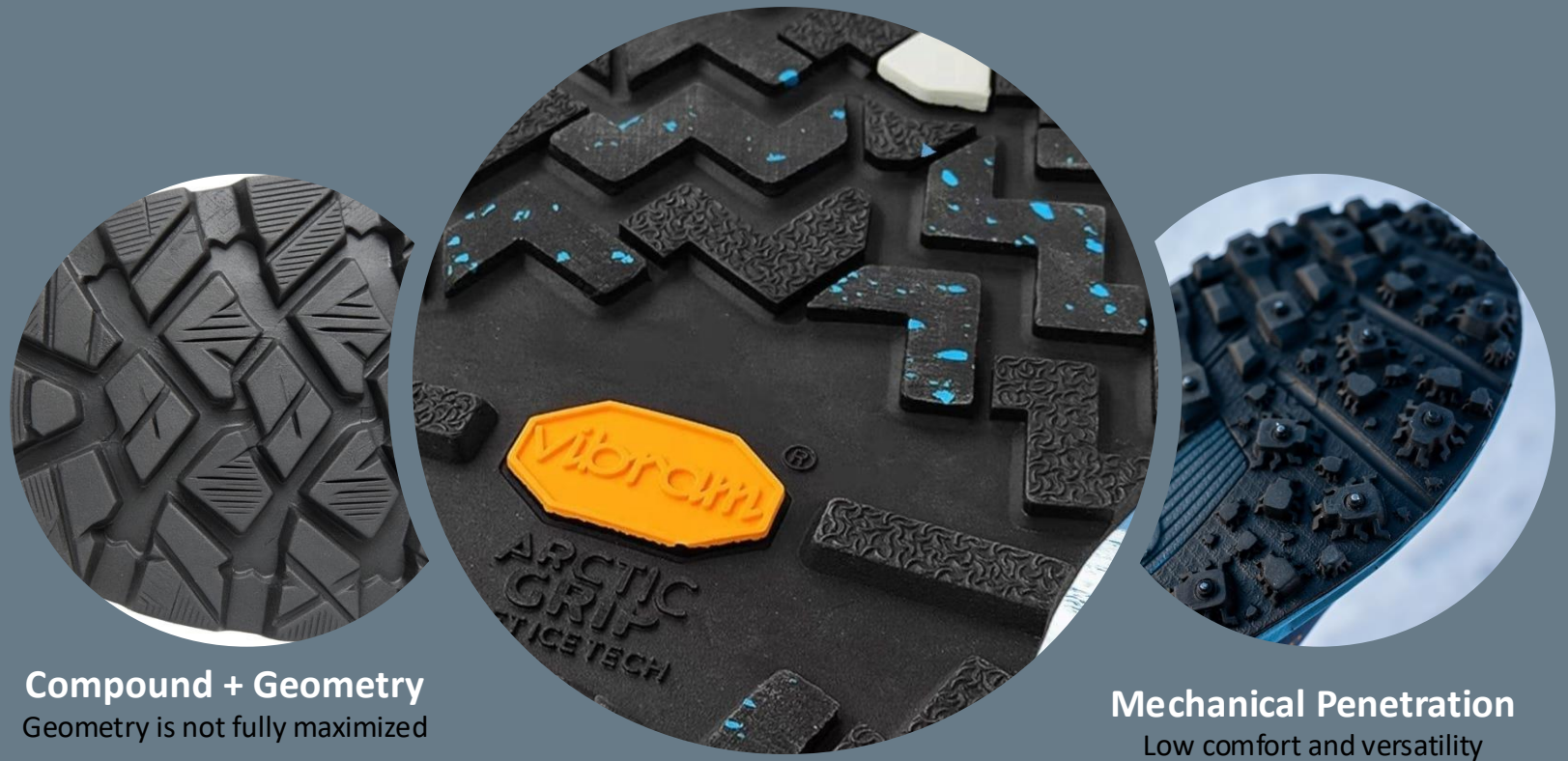
TAM: $12 -18B
SAM: $1.2- 2.5B



Food service workers

TAM: $8 -12B
SAM: $1.8 - 3.2B

Existing solutions come with trade-offs



Compound + Geometry
Geometry is not fully maximized

Compound
Traction fades quickly

Mechanical Penetration
Low comfort and versatility

Islam et al. (2023), *Journal of Safety Research*, 87, 453–464. PubMed, *Bagheri et al. (2022), Applied Ergonomics, 99, 103611. PubMed*, CleatsReport, *Are Ice Cleats Safe to Use?* Read article

We are surrounded by solutions



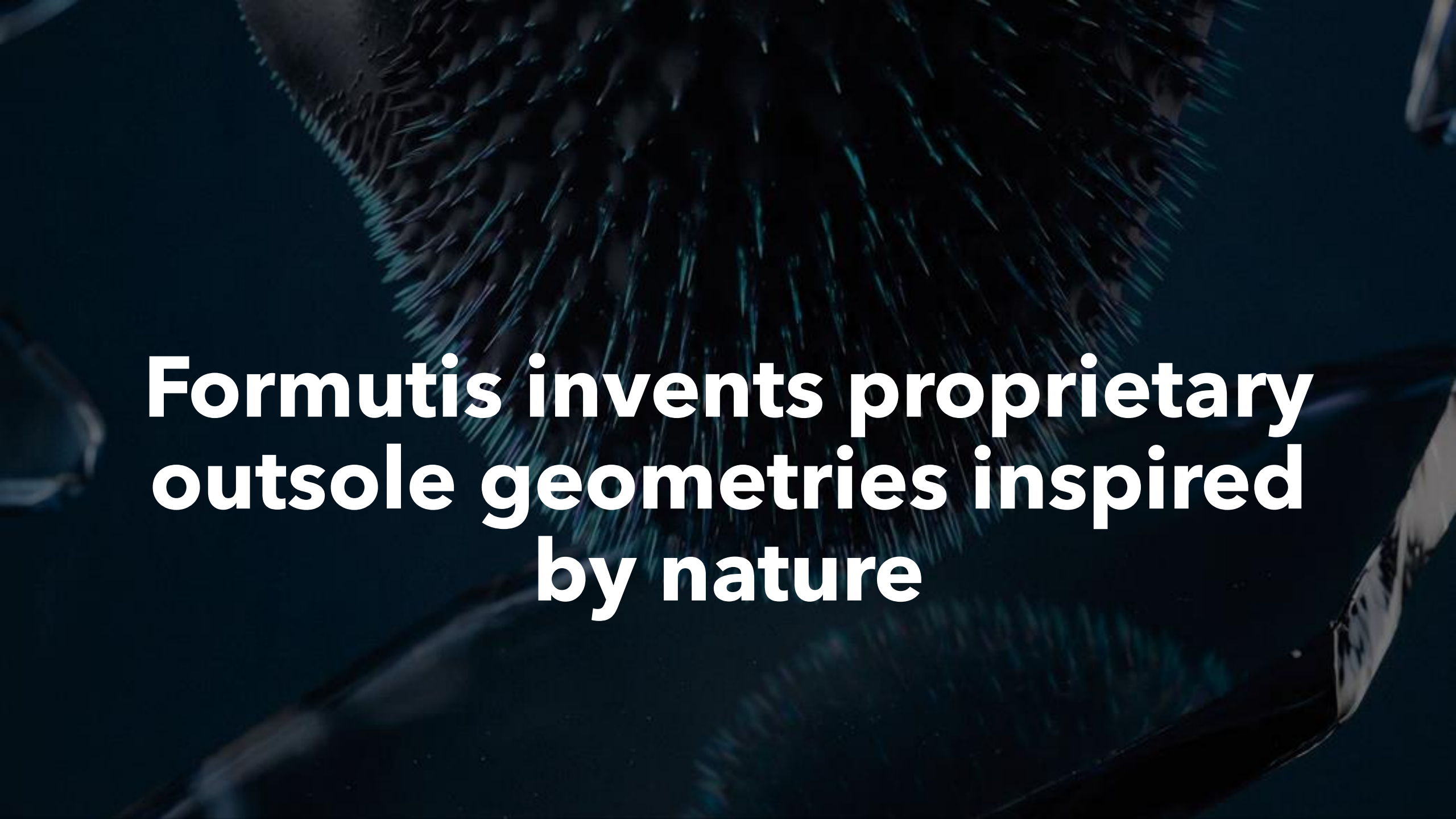
Tree Frog



Octopus

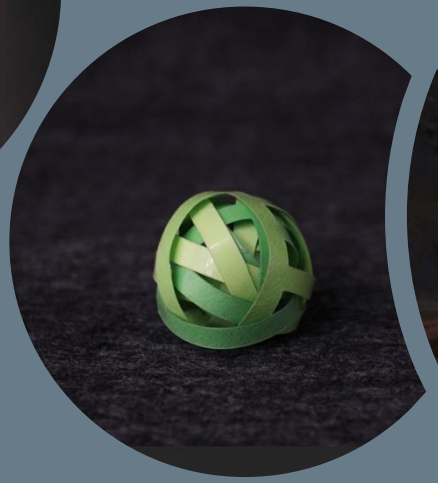


Polar Bear

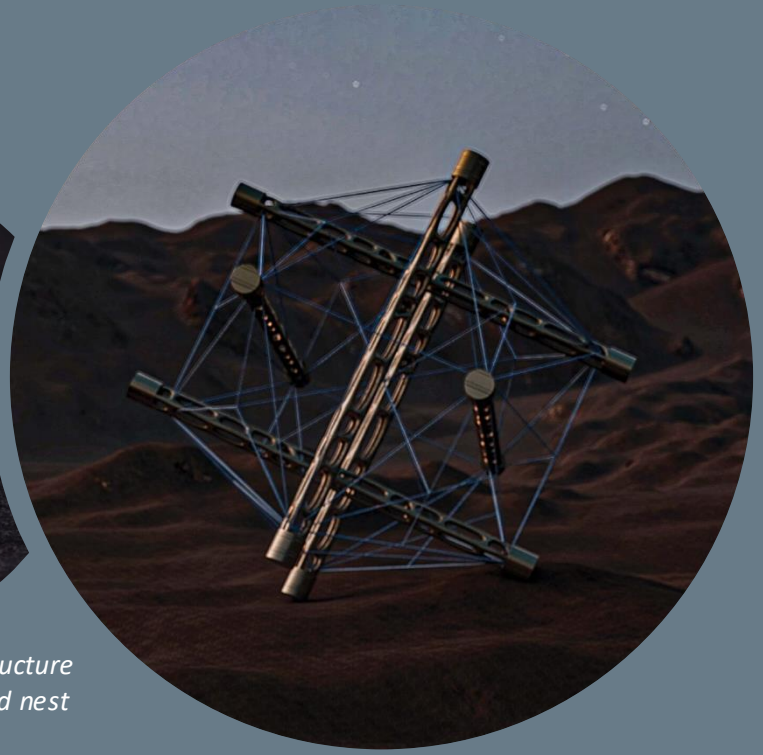

Formutis invents proprietary
outsole geometries inspired
by nature

A little bit about me





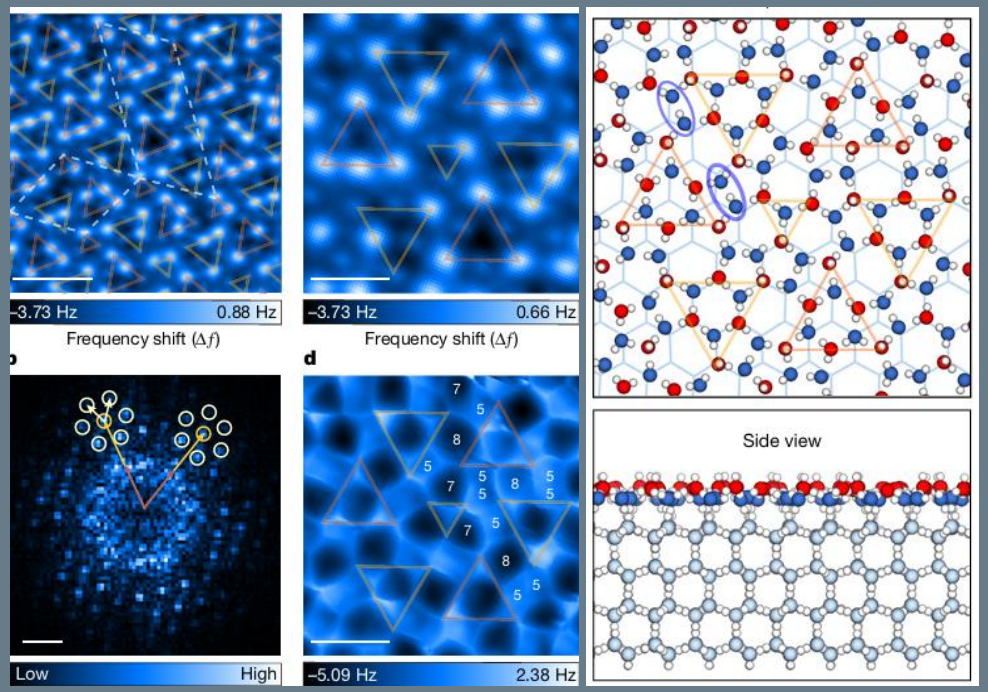
Self shaping from 2D to 3D structure
Inspired by Village weaver bird nest



Beat NASA's Super ball in simulation
Inspired by spider orb web

- Developed technology for a U.S. Department of Defense underwater robotics project.
- Top 1% graduate from Cornell University's Design Technology program, Class of 2026.
- Created nature-inspired inventions featured in D. Tech exhibitions and publications.

Why we slip on ice



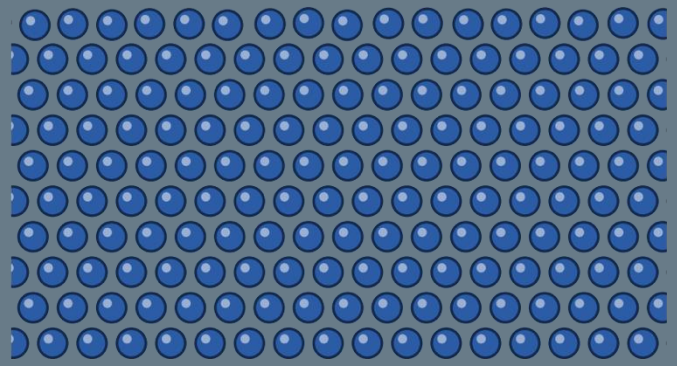
Periodic superstructure of ice surface.



Imaging surface structure and premelting of ice Ih with atomic resolution

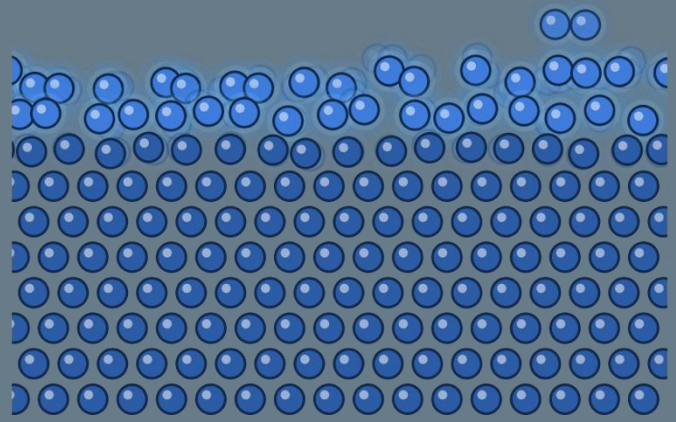
Why we slip on ice

-10°C



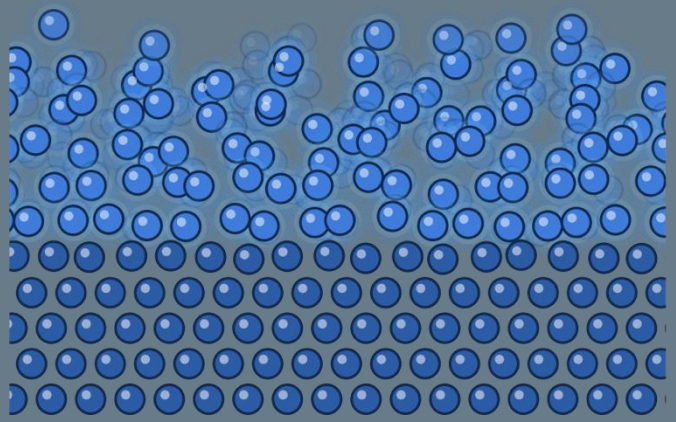


-5°C





0°C

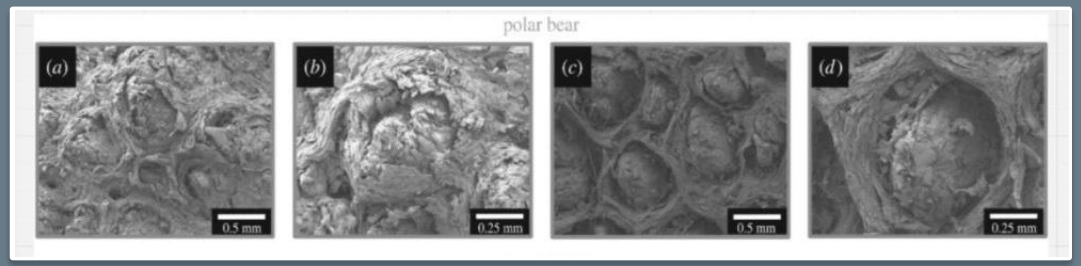


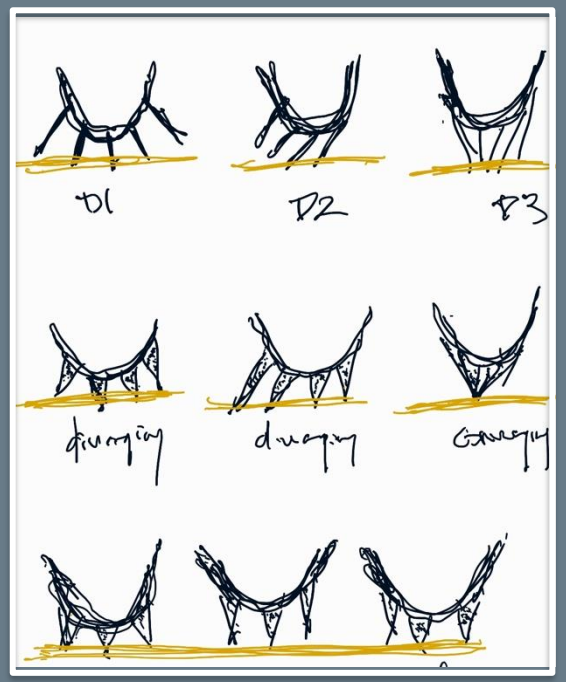


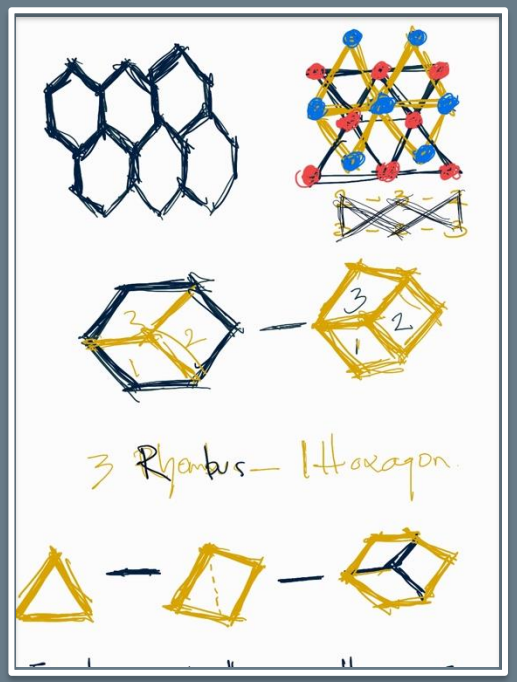
Illustrative images

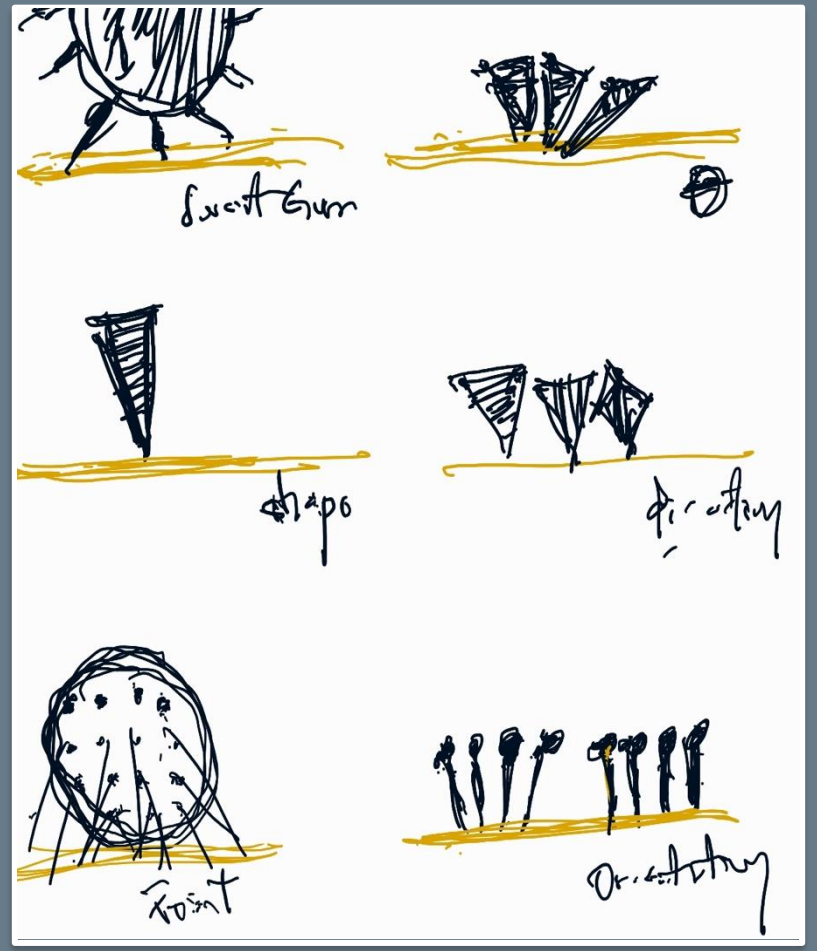
Dynamic nature of ice

Journey from inspiration to invention

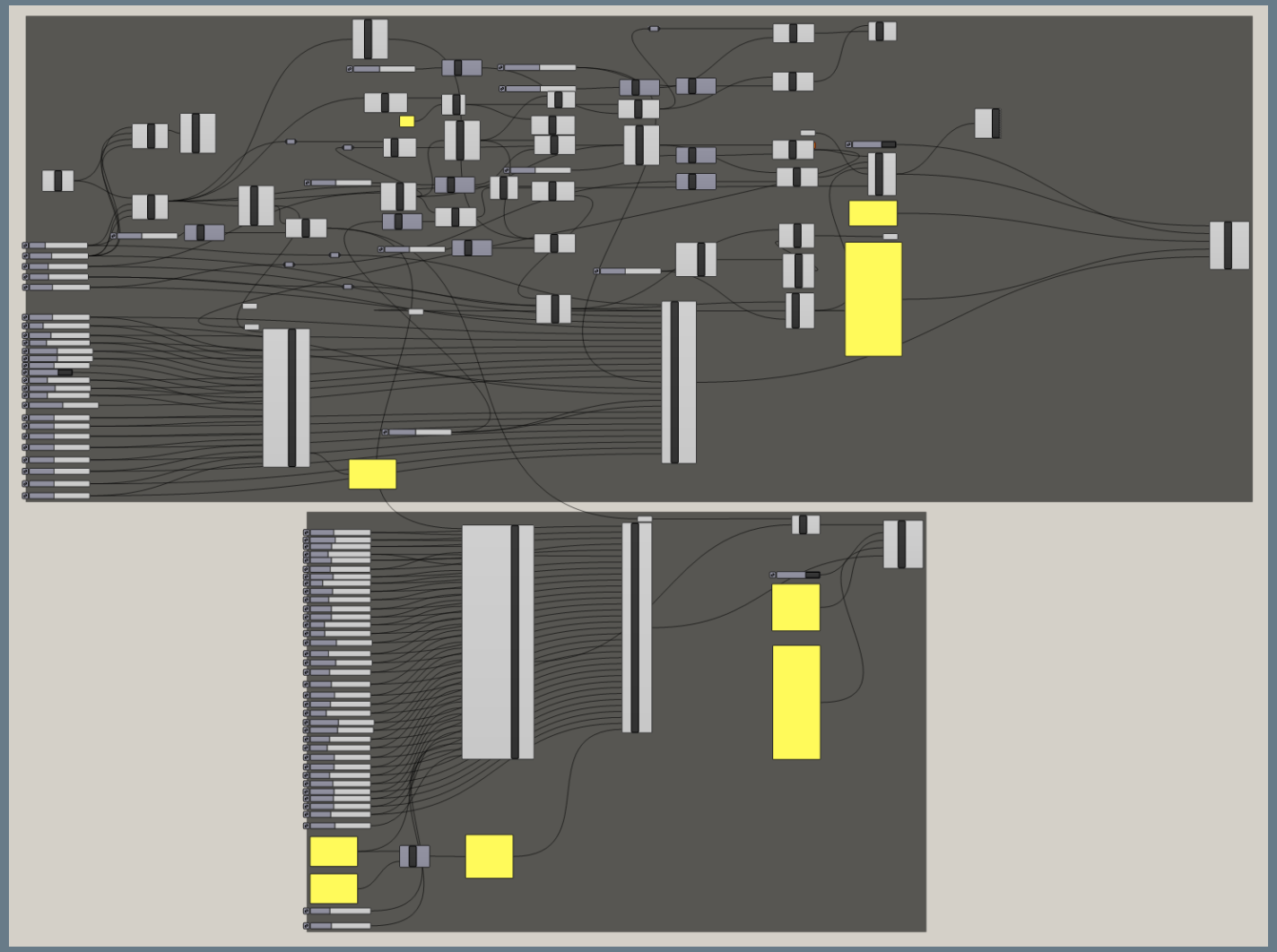




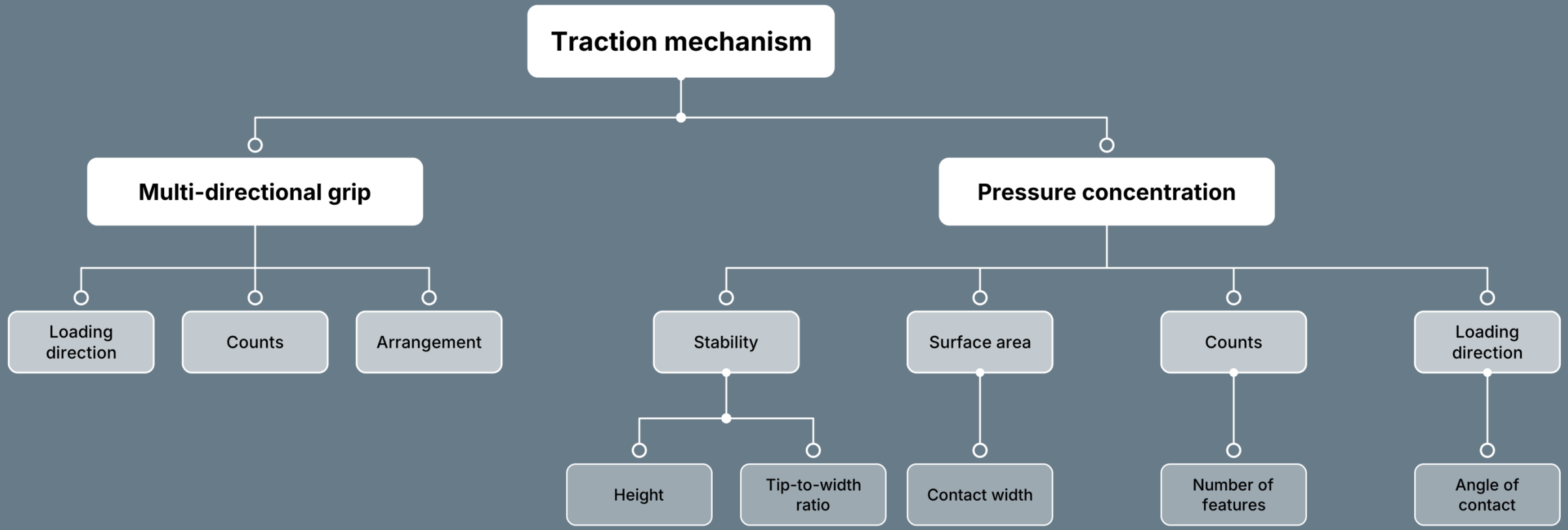




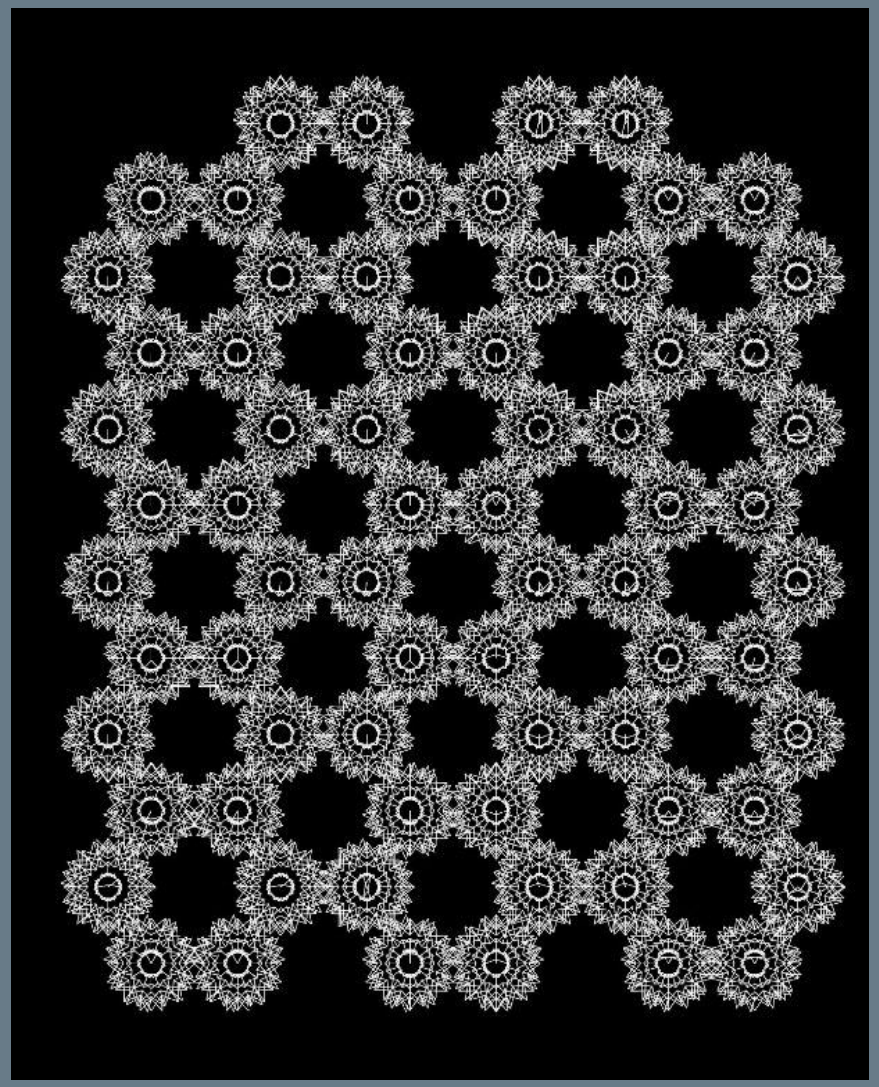
The Engine

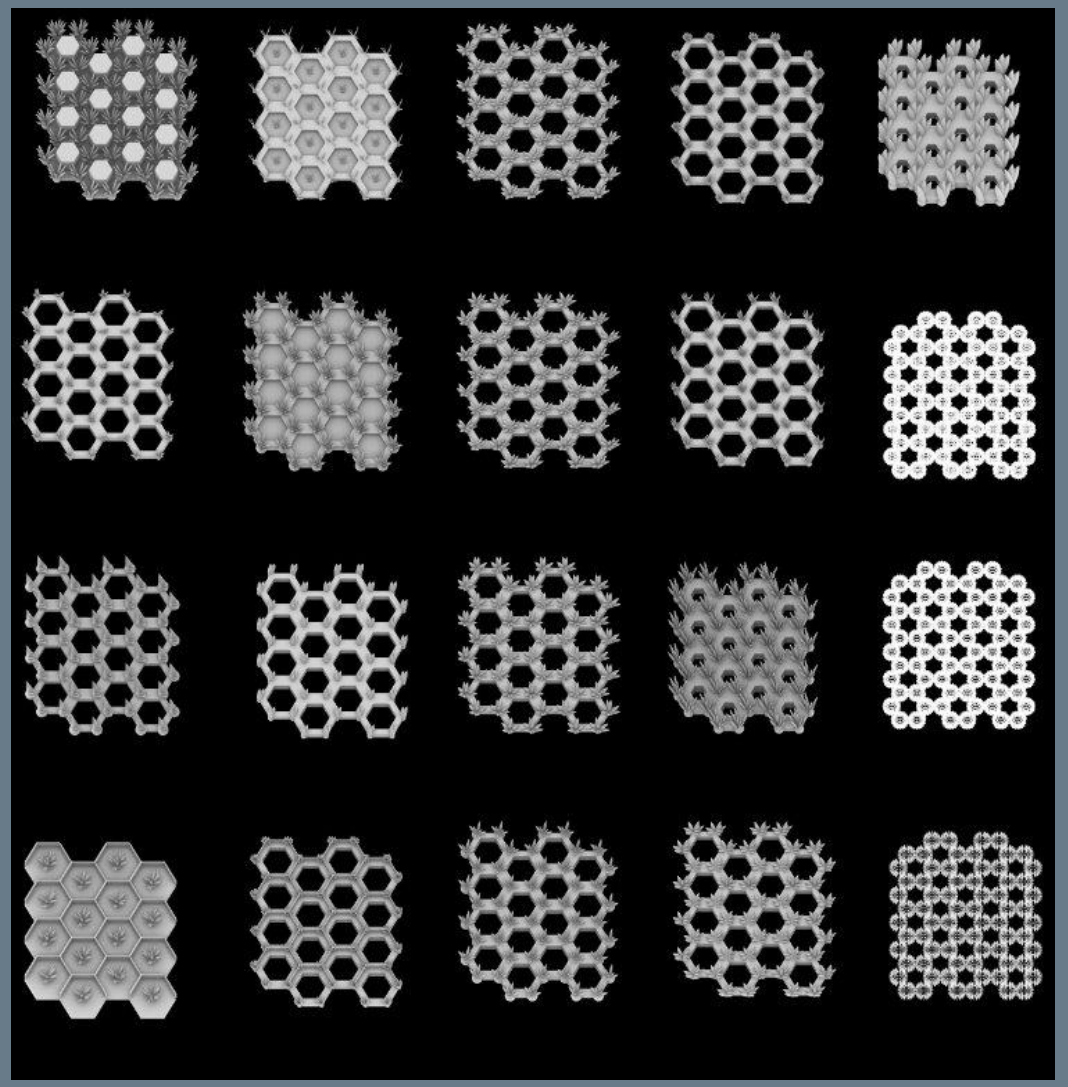


How we achieve traction

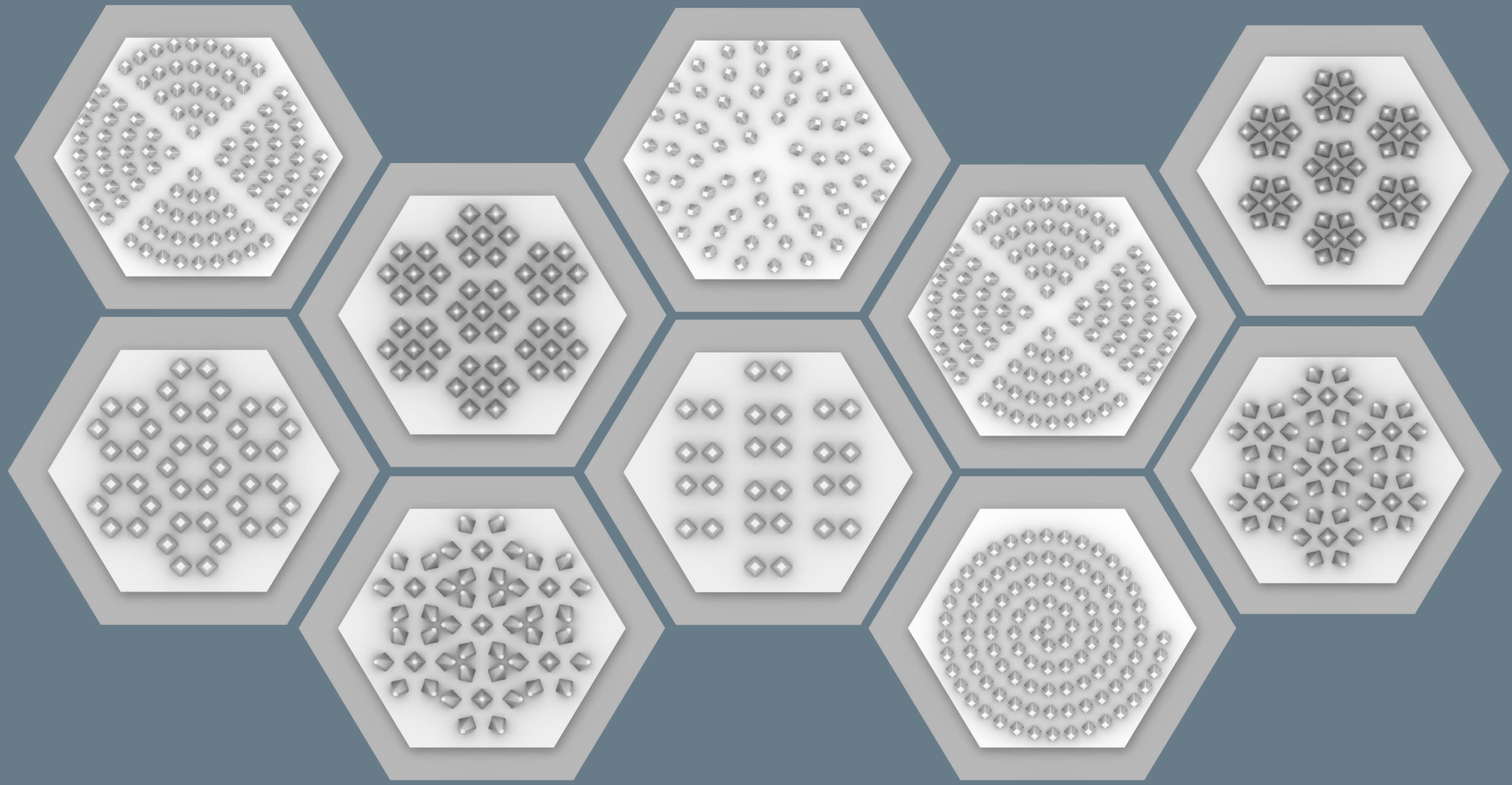


Geometry iterations

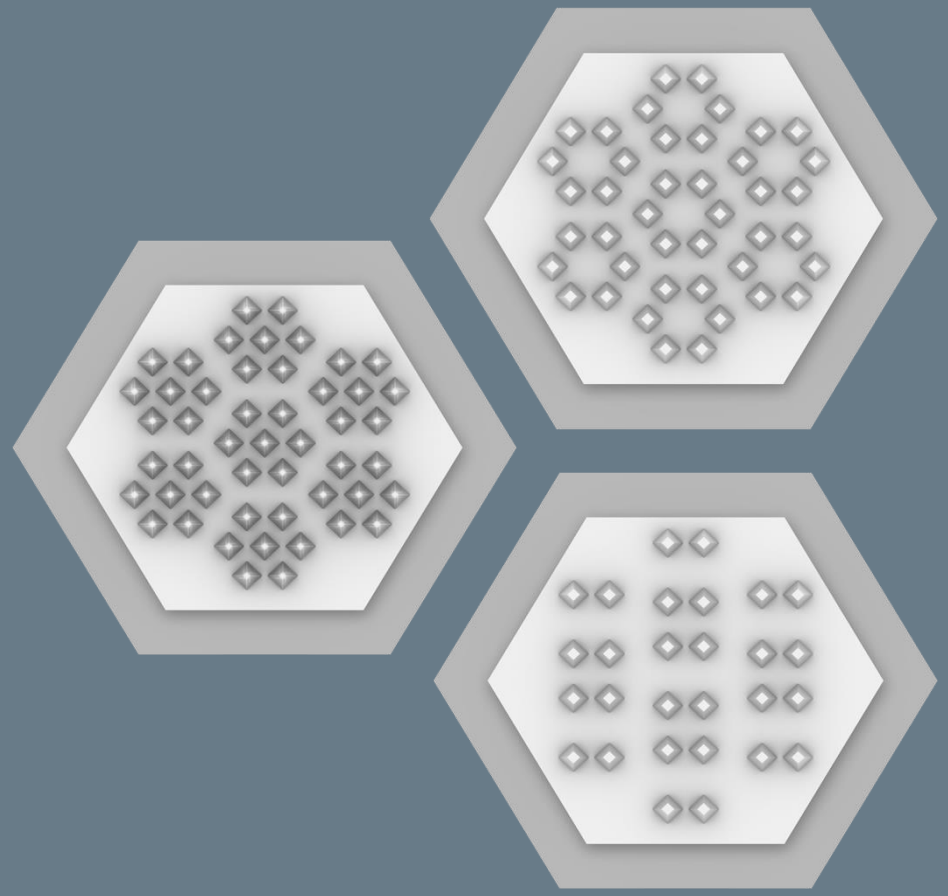




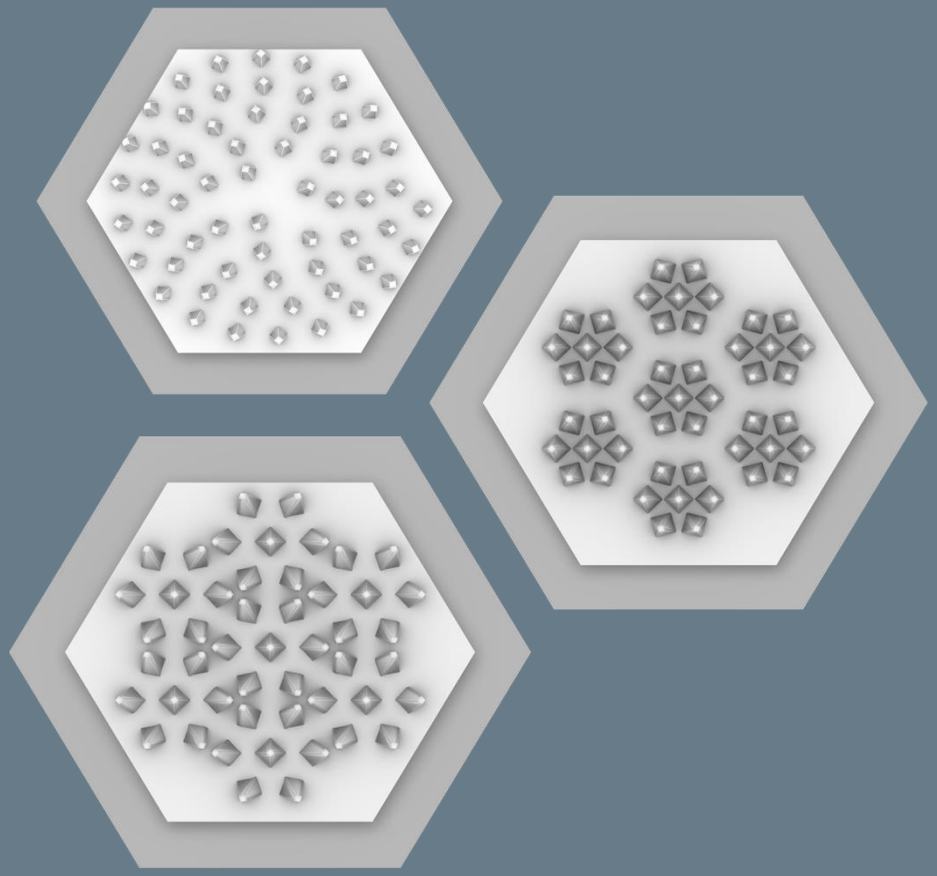
Geometry iterations



Geometry iterations

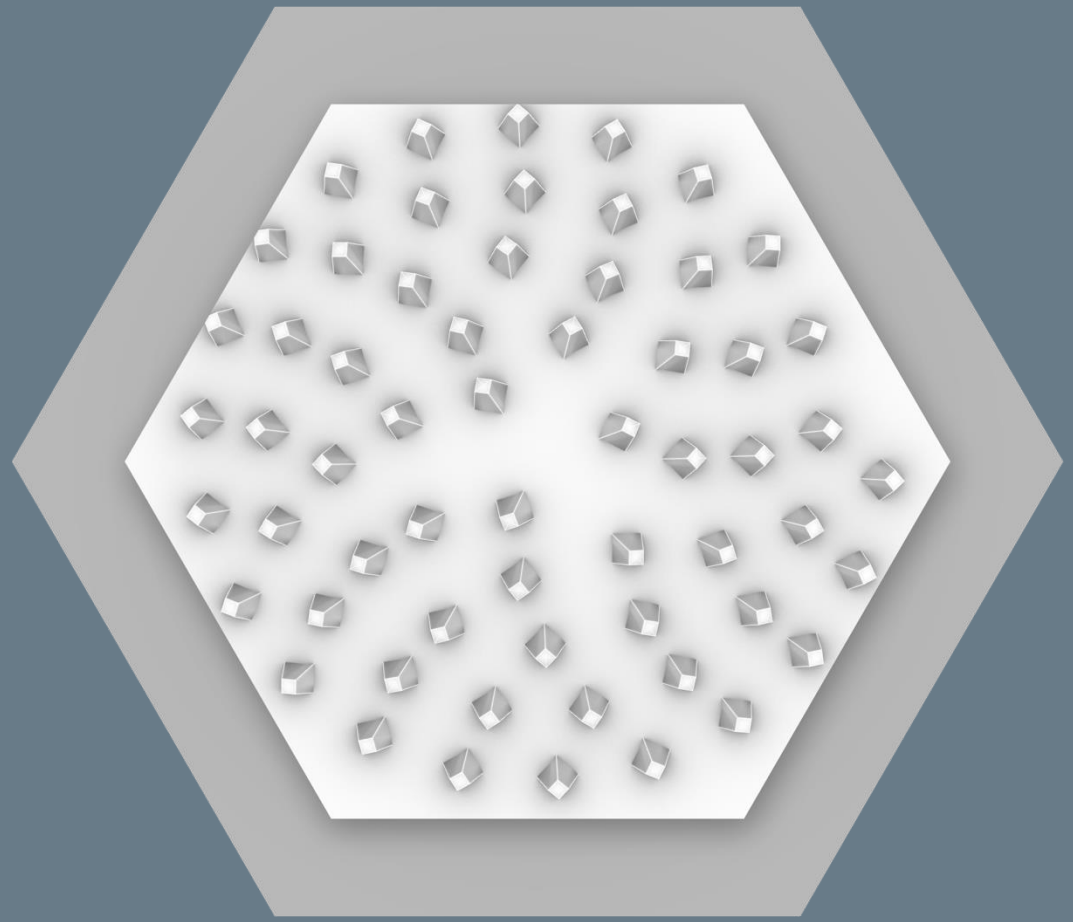


Pressure Concentration



Multi-directional grip

Geometry generation rules



Equations

$r_n = c\sqrt{n}$

$\theta_n = n \cdot 137.5°$

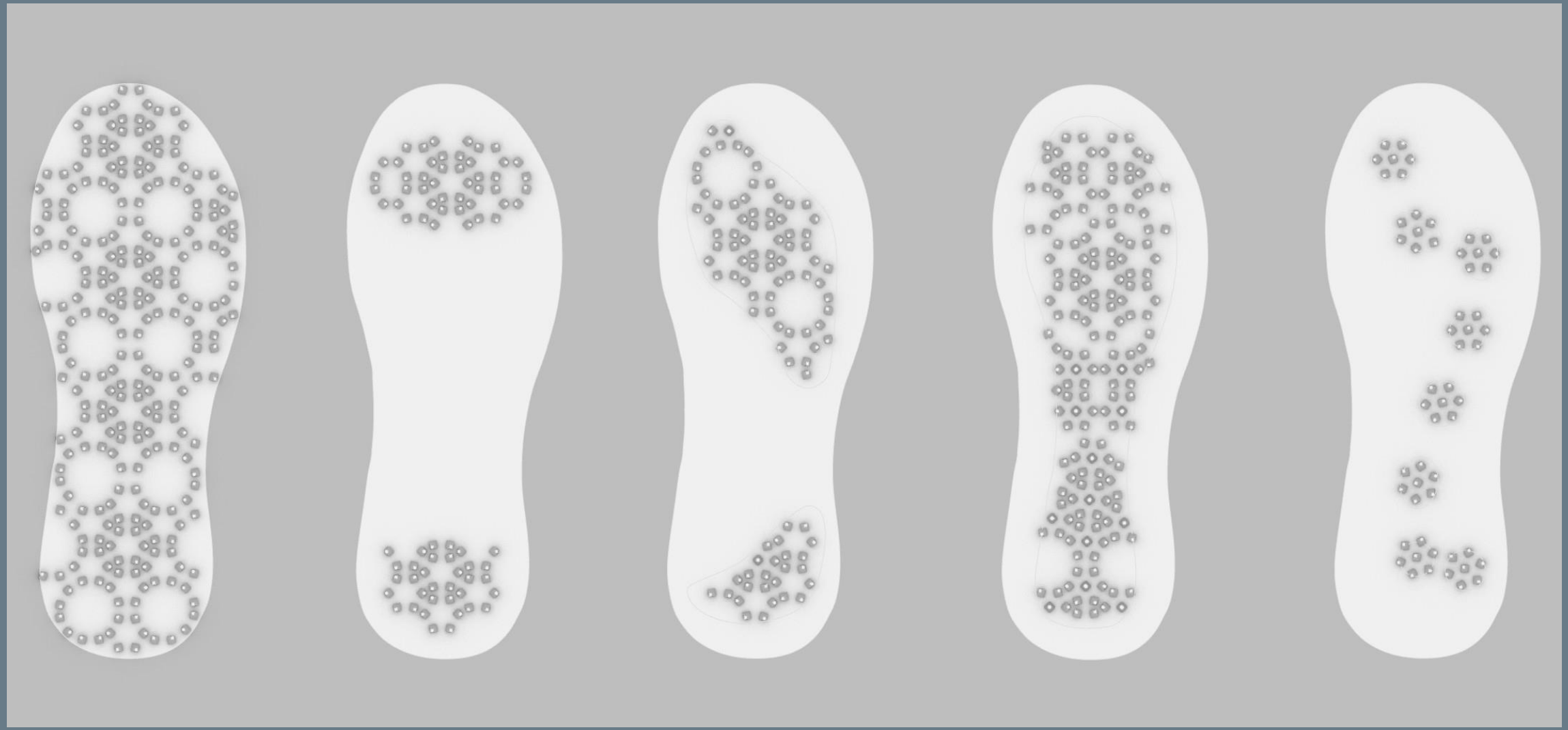
$\alpha = h / 2r_b$

$d_{min} \geq 0.05$ mm

$\alpha \leq 3$

draft $\geq 3°$

From geometry to footwear outsole



Testing on icy surface – multidirectional grip



Different geometries – different performance

1ST test

Testing on icy surface – pressure concentration



Human gait testing

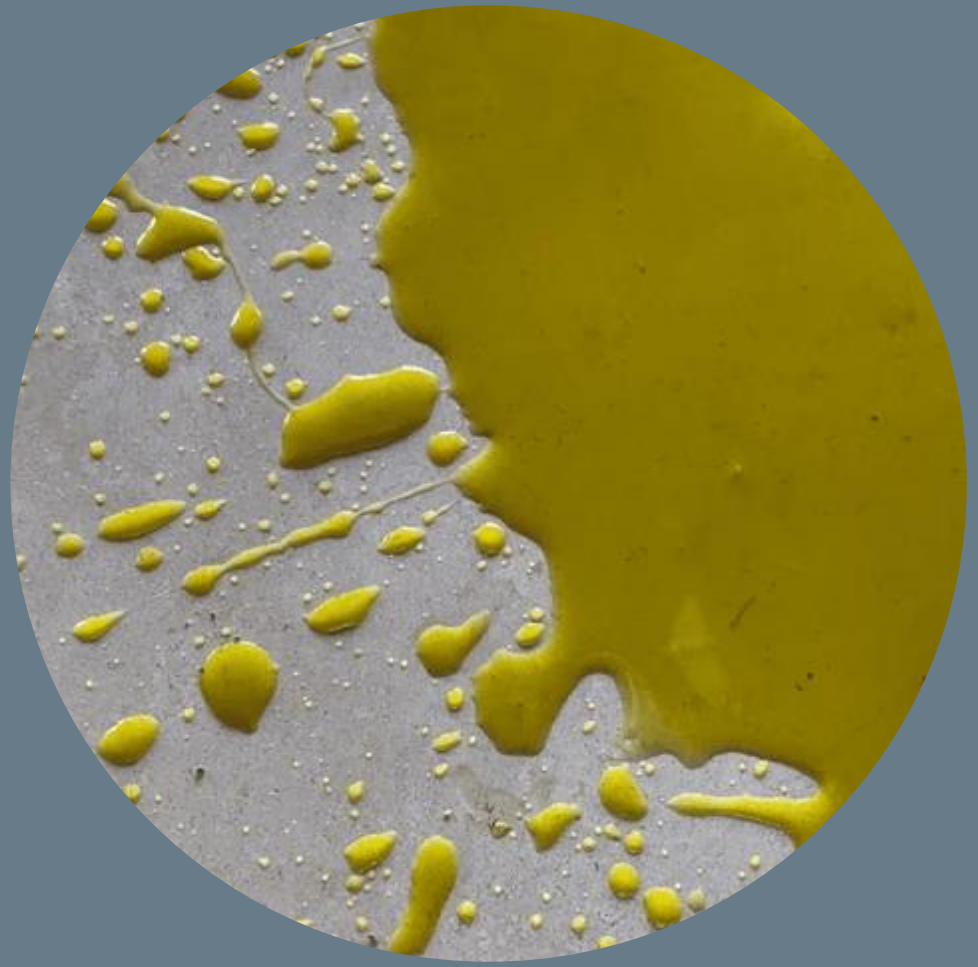
2nd test



Optimized for both human gait + performance

3rd test

Beyond traction on icy surface



Oily surface

Testing on oily surface



Formutis geometry on both foot

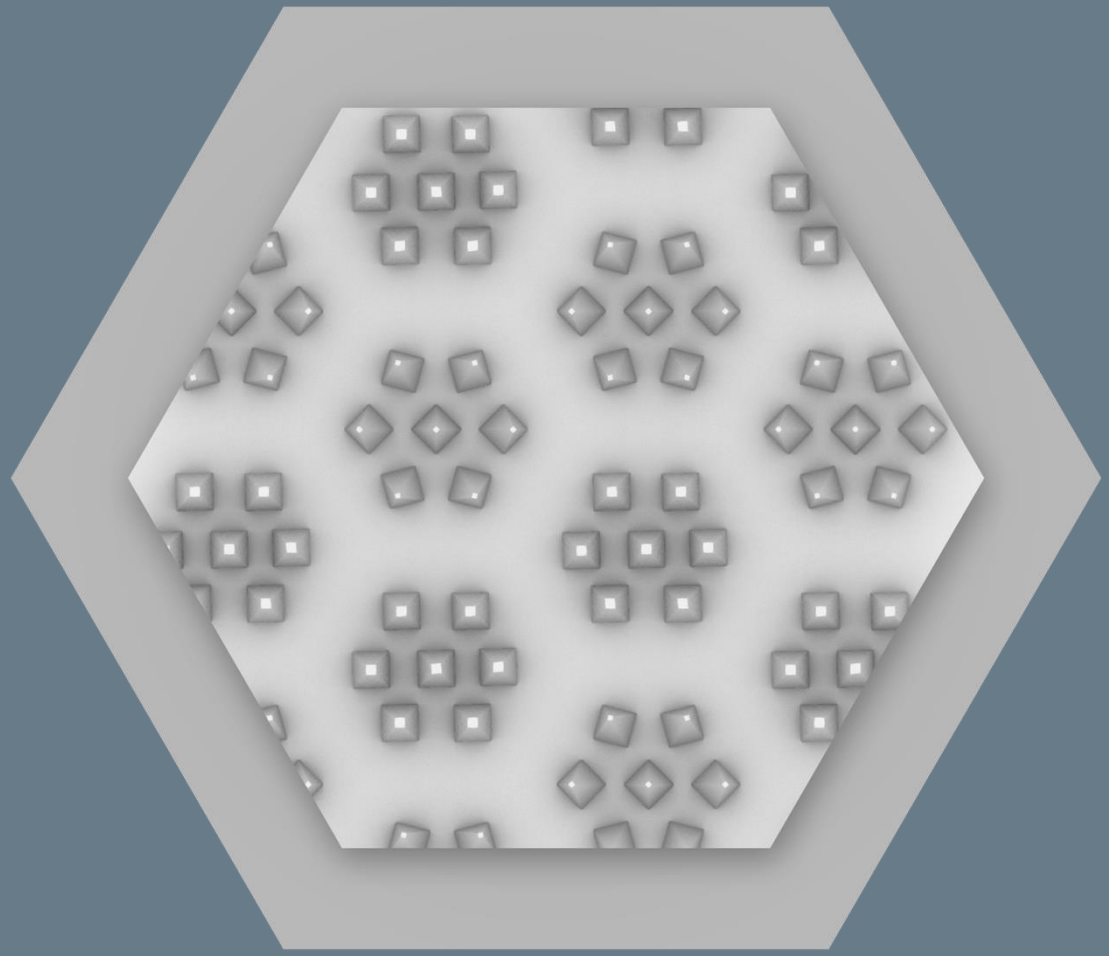
1ST test



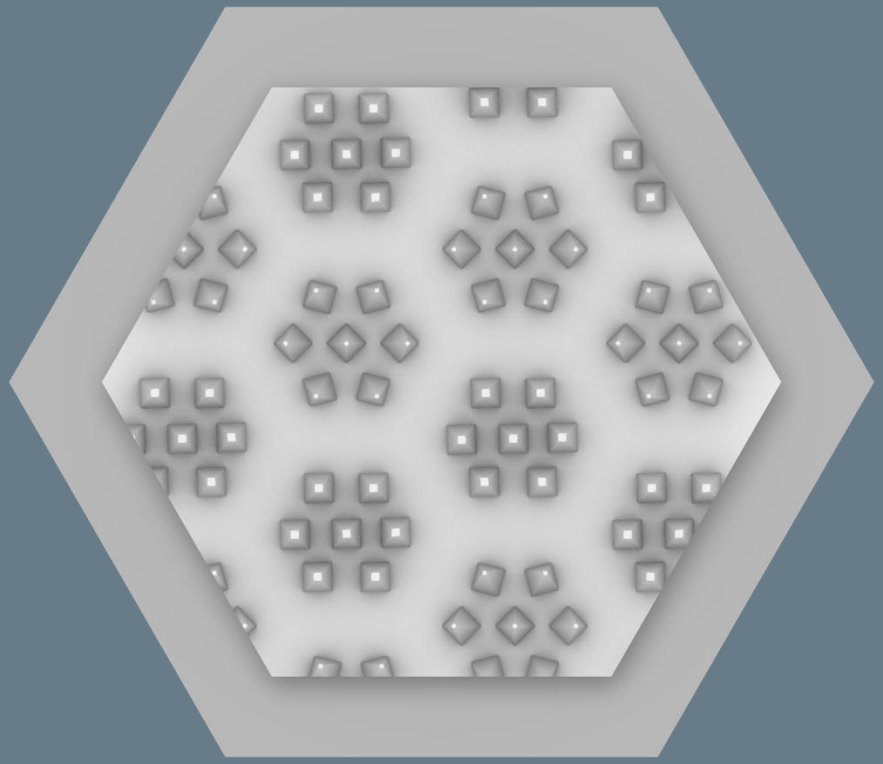
Formutis geometry on the right foot

2nd test

Multi-directional grip + Pressure concentration



Lab test samples



Sample 1



Sample 2

Lab test result

Milestone and Achievement

Cornell University

Best M.S. DT specialization project at Cornell University

kite

Secured partnership with WinterLab at Toronto

anima

Top 10 in a global Anima's Out of the Lab competition

UNITED STATES PATENT AND TRADEMARK OFFICE uspto

Secured IP

KEEN ICEBUG

Secured interest of some footwear brands

footwear innovation FOUNDATION

Elite 8 in a global Footwear Launchpad competition

Next Step – Toward partnership

1

Leverage FIF networks for brands outreach

2

Secure brands partnerships

- Continuous lab testing
- Tread optimization
- Proof and wear testing
- Environment fit wear testing

Together we can



Make every steps safer