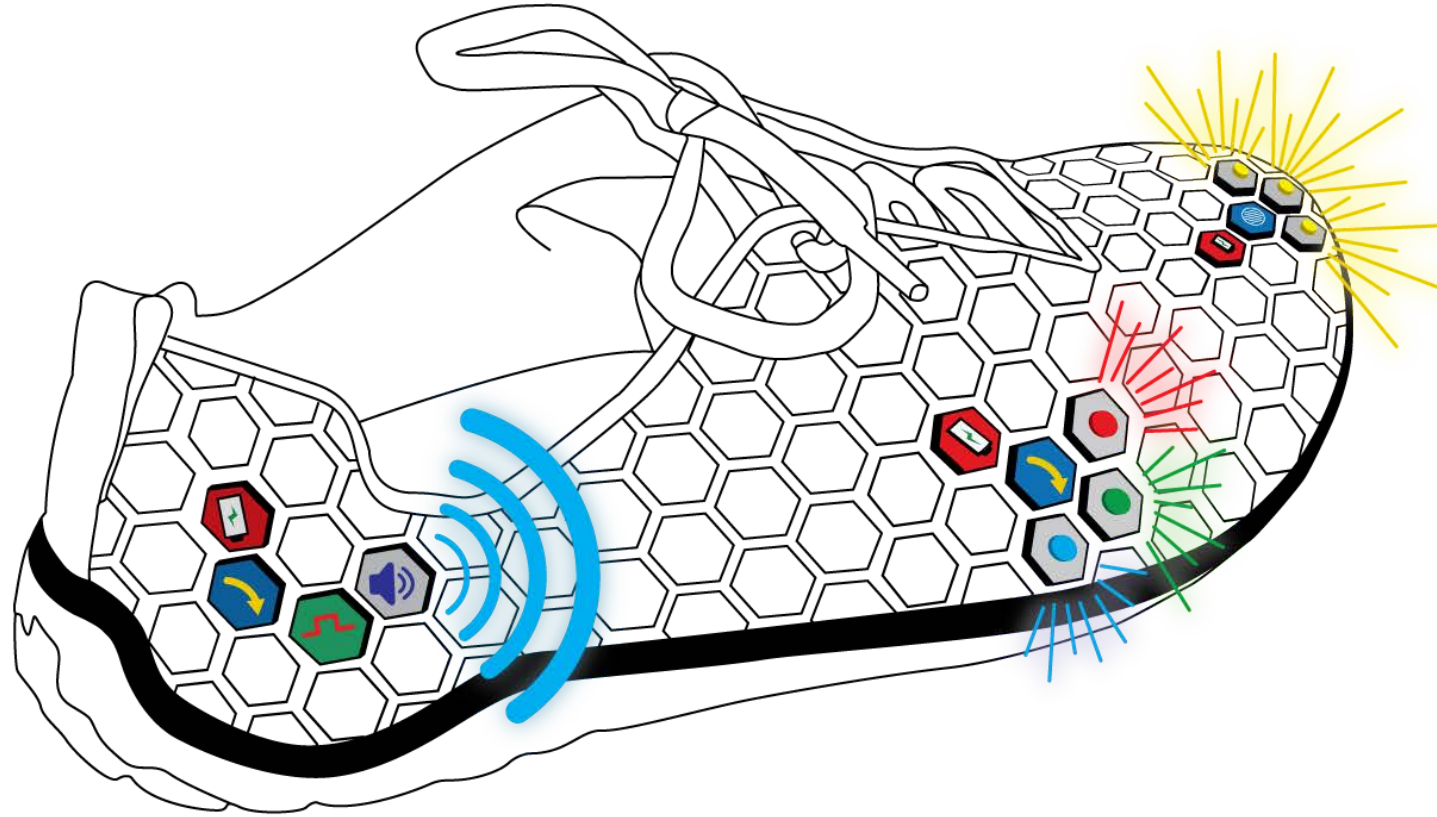


MakerShoe:

Towards an E-Textile Construction Kit to Support Creativity, Playful Making, and Self-Expression



Majeed Kazemitabaar¹, Leyla Norooz², Mona Leigh Guha², Jon E. Froehlich¹

University of Maryland: Computer Science¹, Information Studies²



Light Up Shoes...

Self-Expression



Experiential
Learning About
Electronics and
Craft!



Provide Creative
Outlet Support



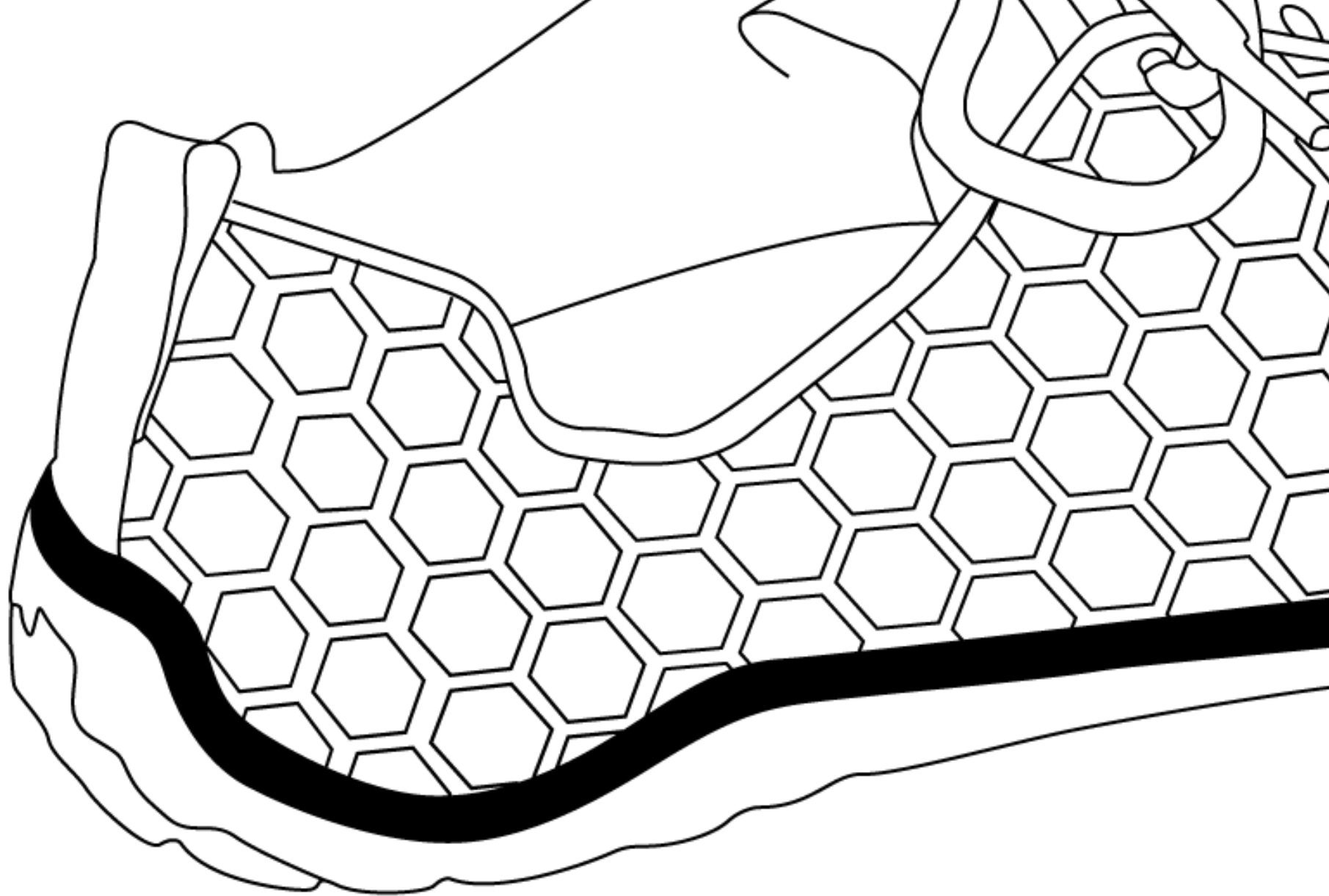
"BuzzStep"

 Power source




 Tilt sensor

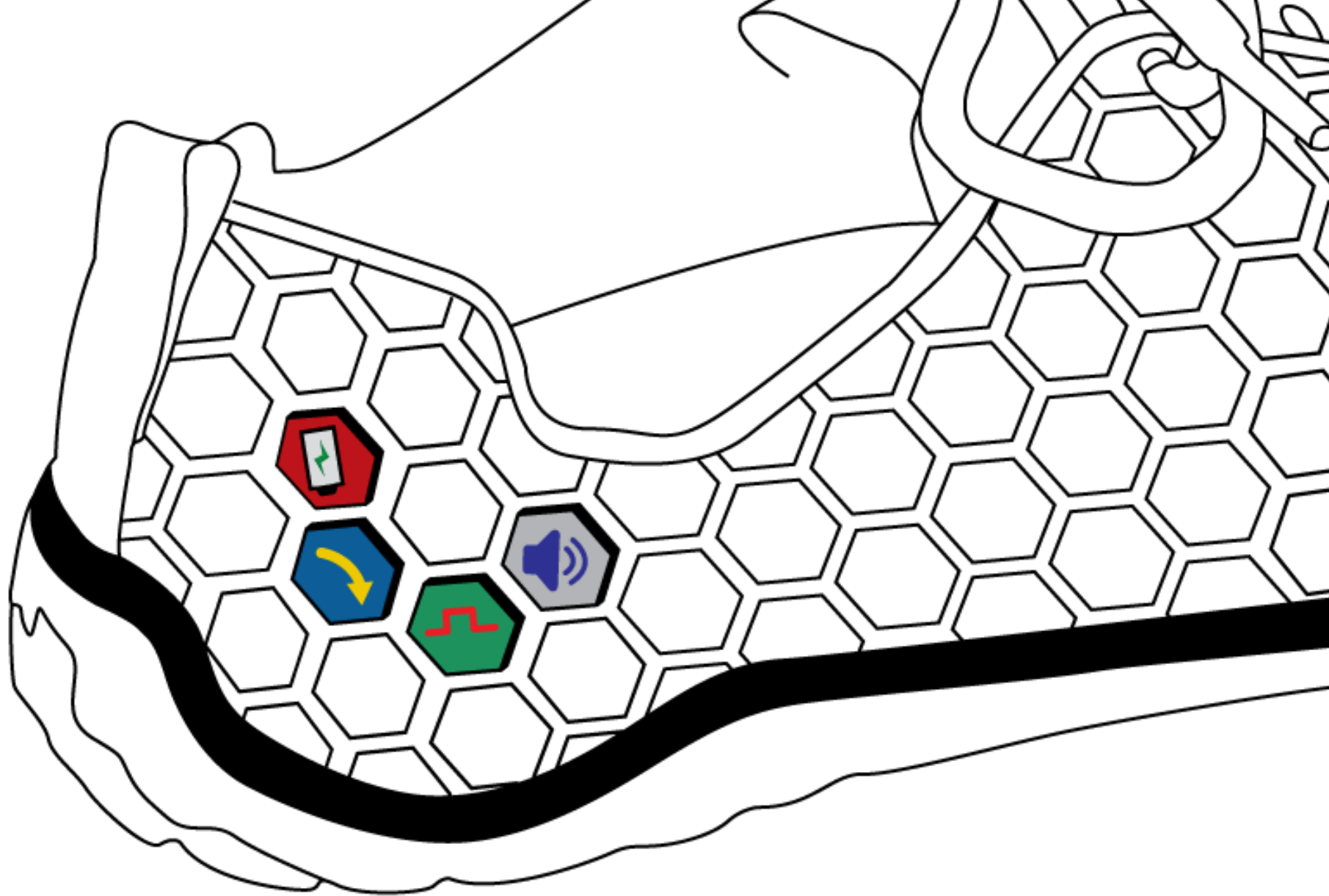
 Oscillator

 Buzzer







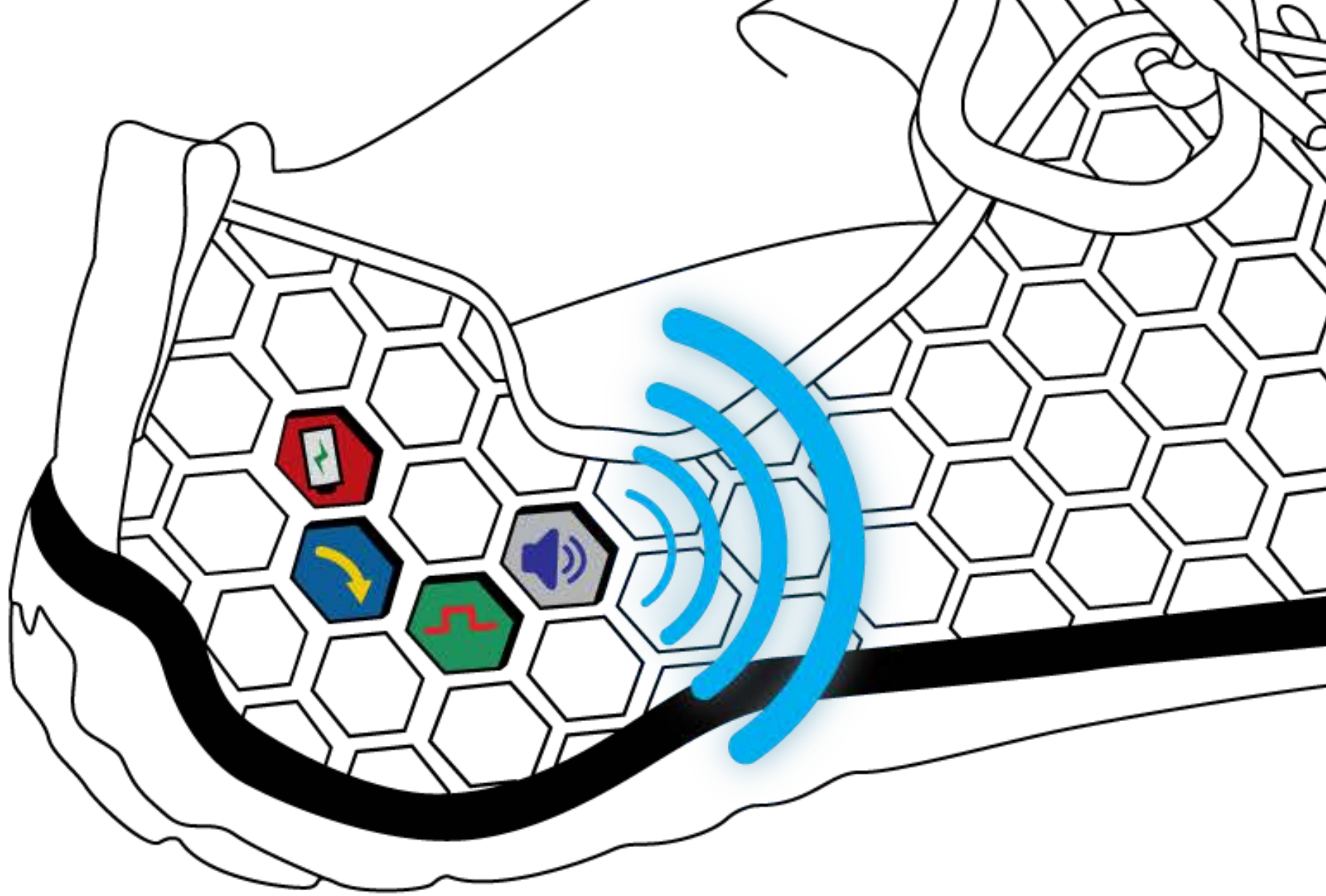
"BuzzStep"

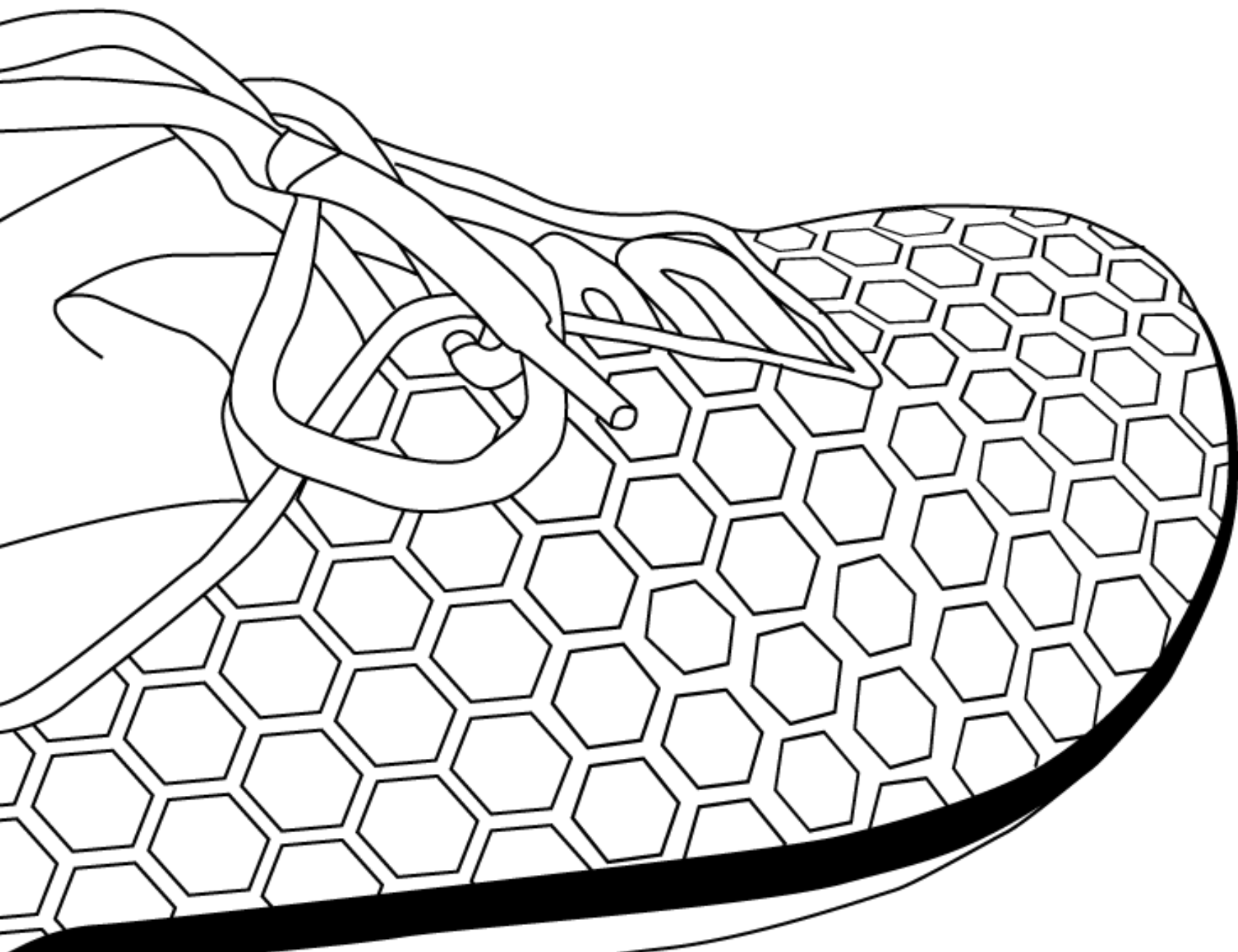
-  Power source
-  Tilt sensor
-  Oscillator
-  Buzzer



"BuzzStep"

-  Power source
-  Tilt sensor
-  Oscillator
-  Buzzer





"LightUp"



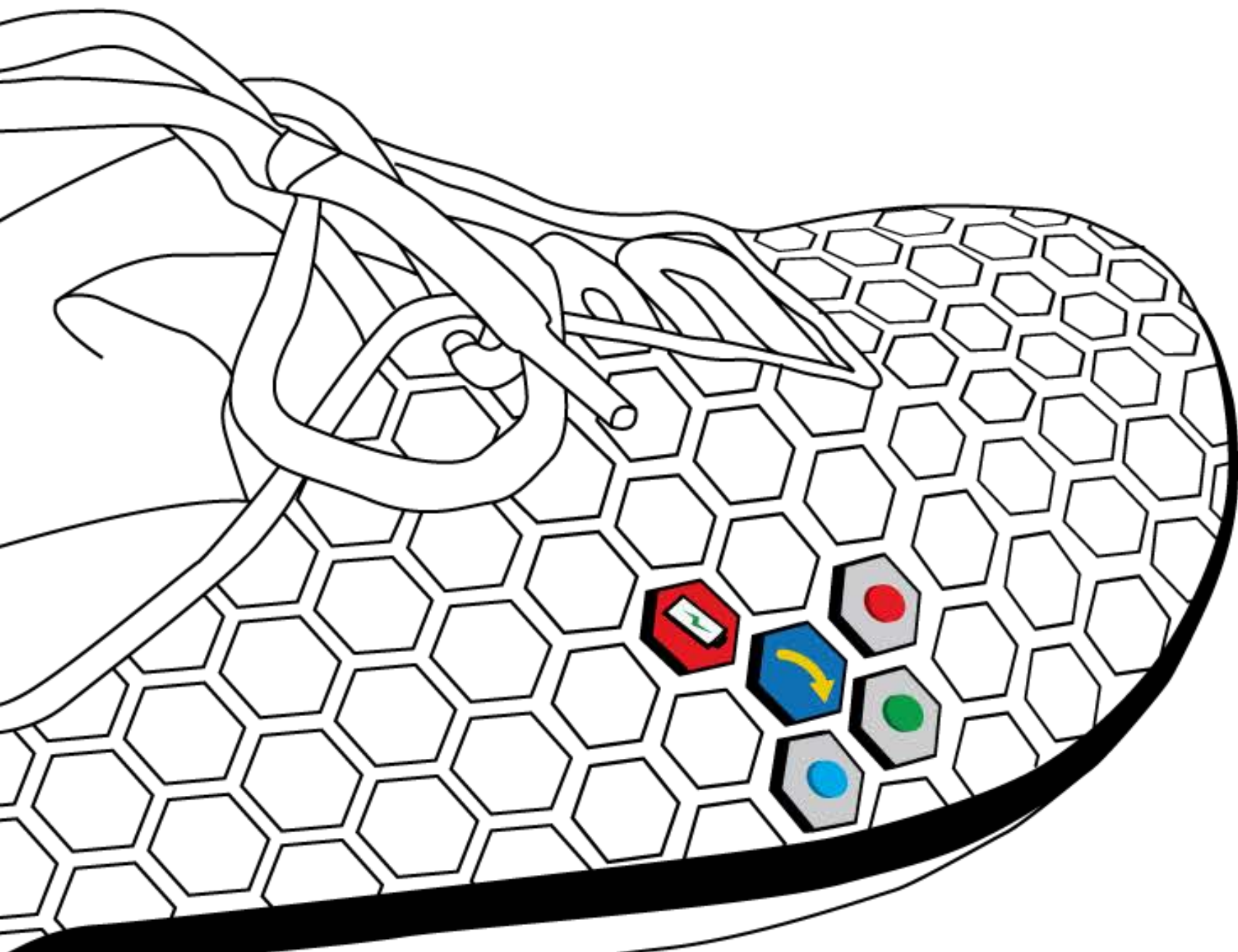
Power source



tilt sensor



LED x 3



"LightUp"



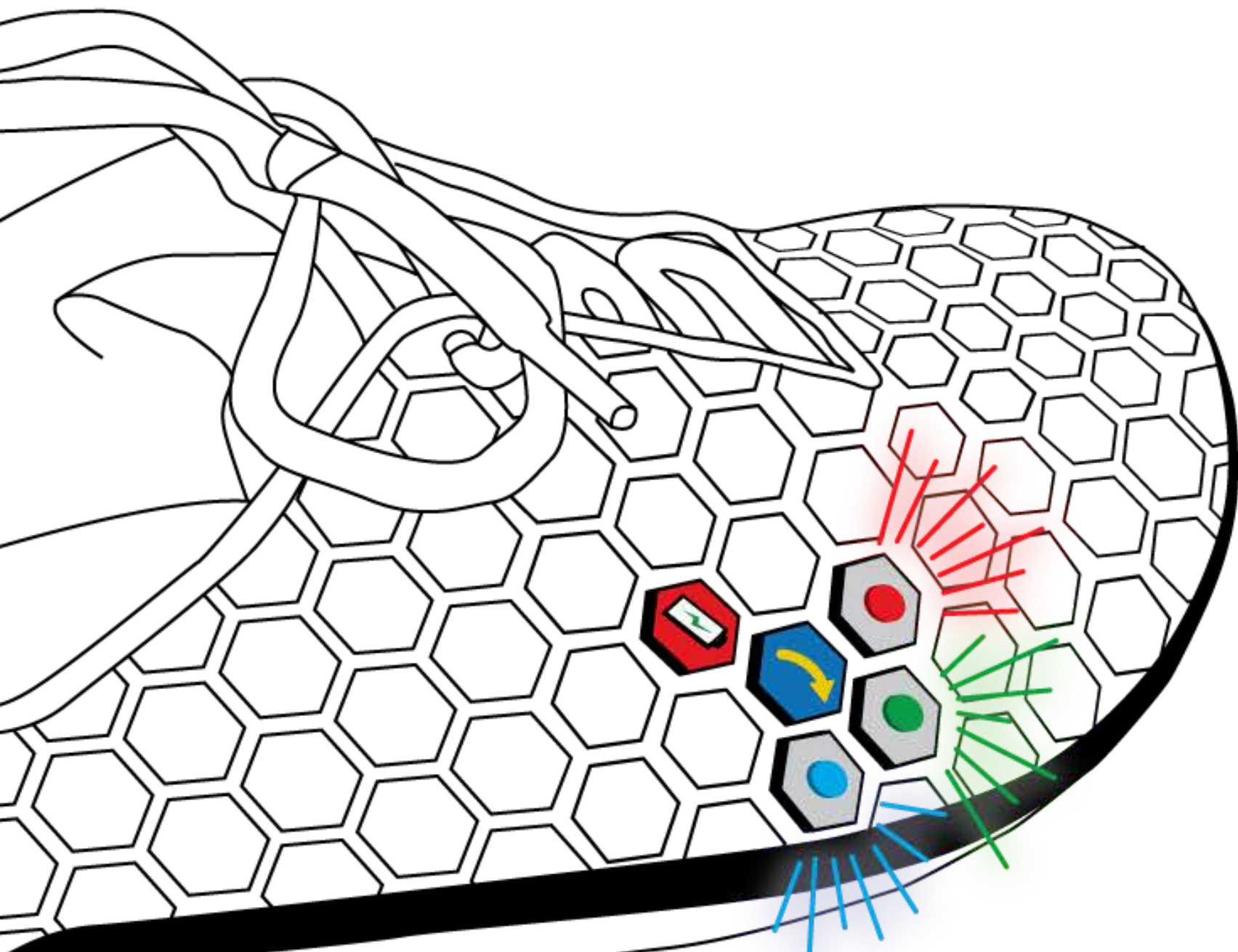
Power source






tilt sensor







LED x 3






"LightUp"

-  Power source
-  tilt sensor
-  LED x 3




"BuzzStep"

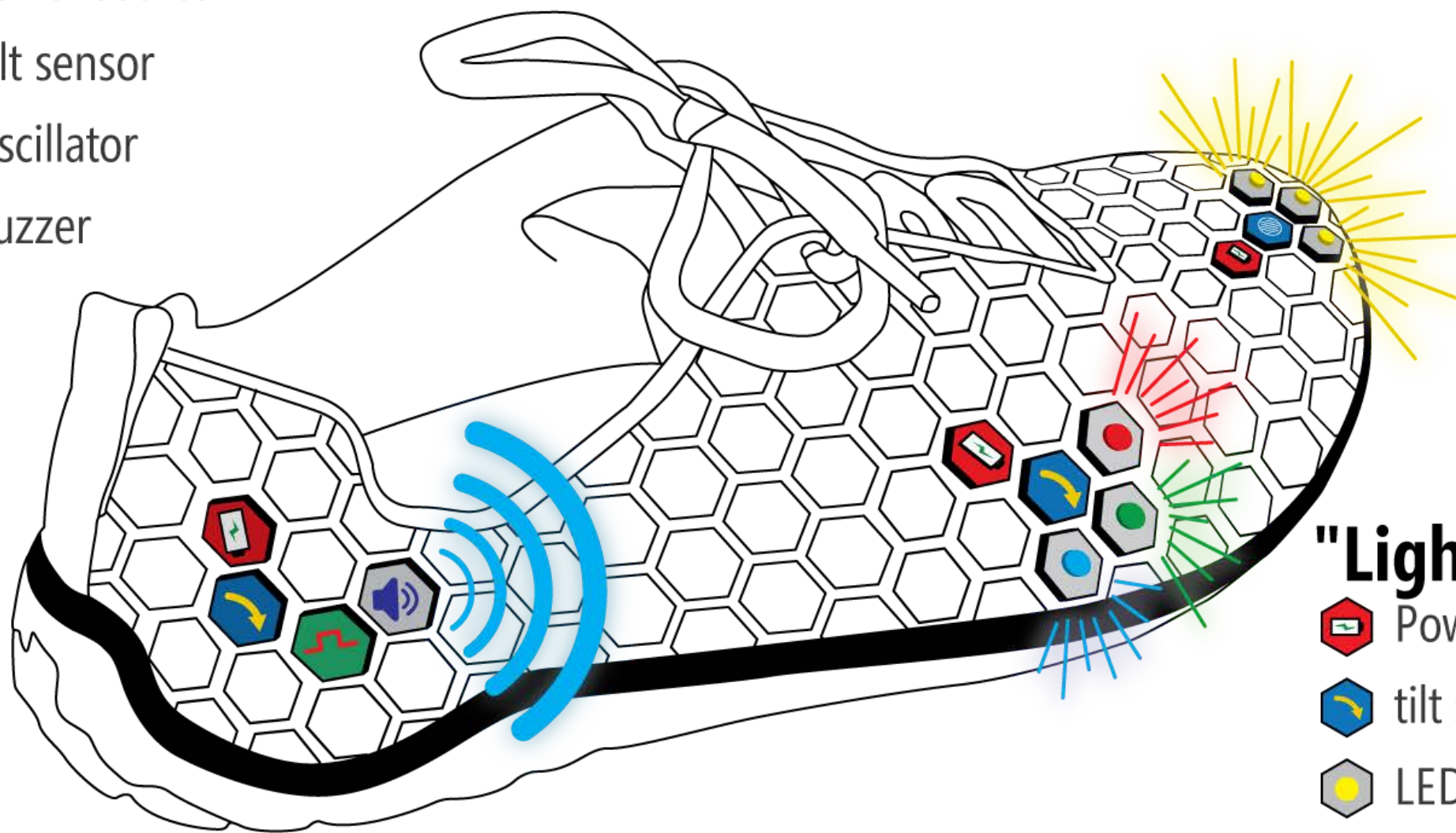
-  Power source
-  Tilt sensor
-  Oscillator
-  Buzzer

"Headlights"

-  Power source
-  Light sensor
-  LED x 3

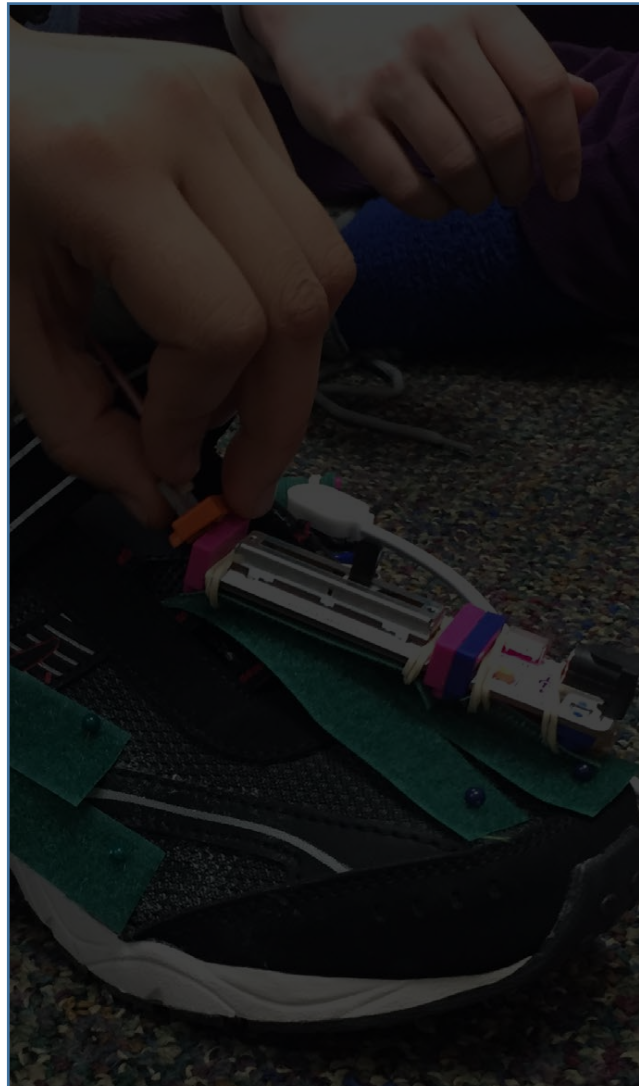
"LightUp"

-  Power source
-  tilt sensor
-  LED x 3

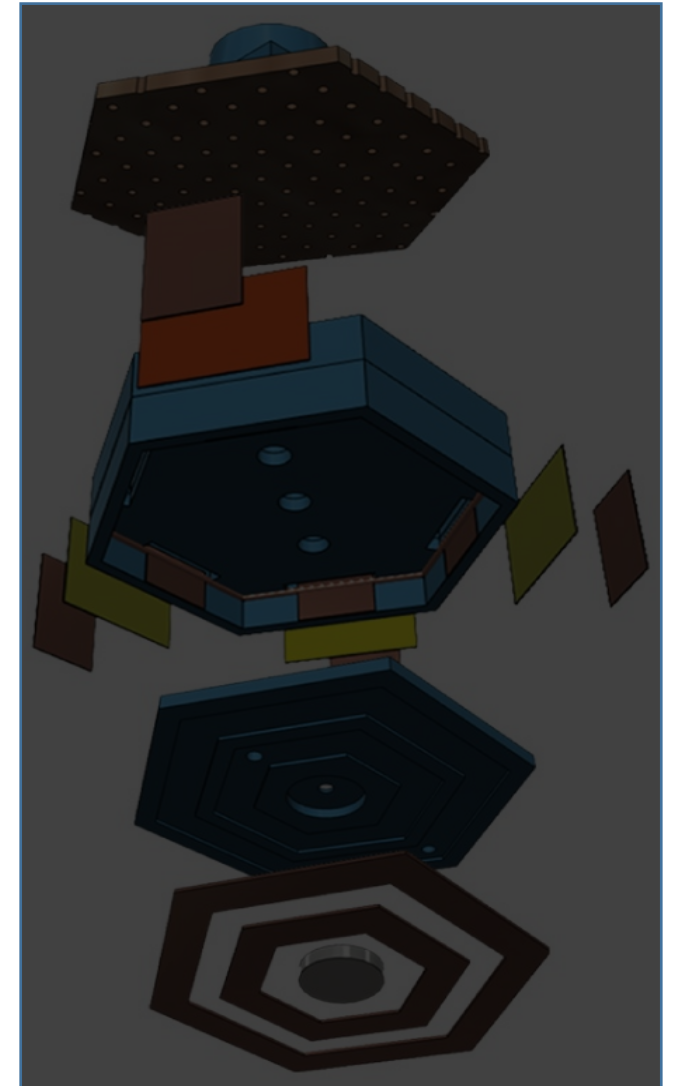




Co-design Session 1



Co-design Session 2



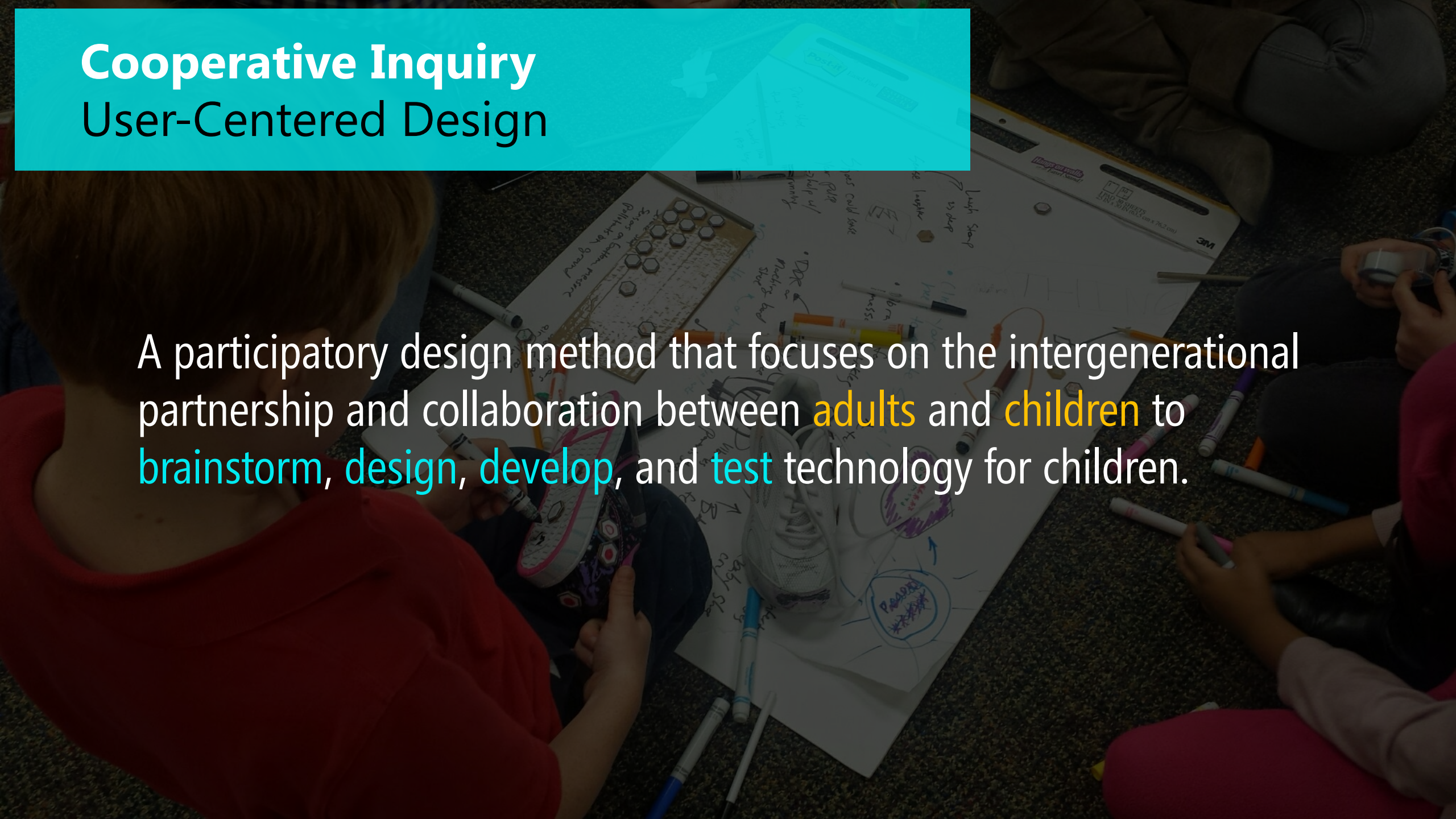
System Design

what children want to make on their shoes and **how** they want to do that

Cooperative Inquiry

User-Centered Design

A participatory design method that focuses on the intergenerational partnership and collaboration between **adults** and **children** to **brainstorm**, **design**, **develop**, and **test** technology for children.



1st Co-Design Session

Method

A 'blue sky' method to elicit unbounded ideas for interactive shoes.

participatory design sessions with 6 children + 5 adults

Shoes + adhesive cardboard pieces + large post it pads + markers



1st Co-Design Session Outcomes

The **themes** and **design ideas** that emerged:

Personalization

Gestures

Achievements

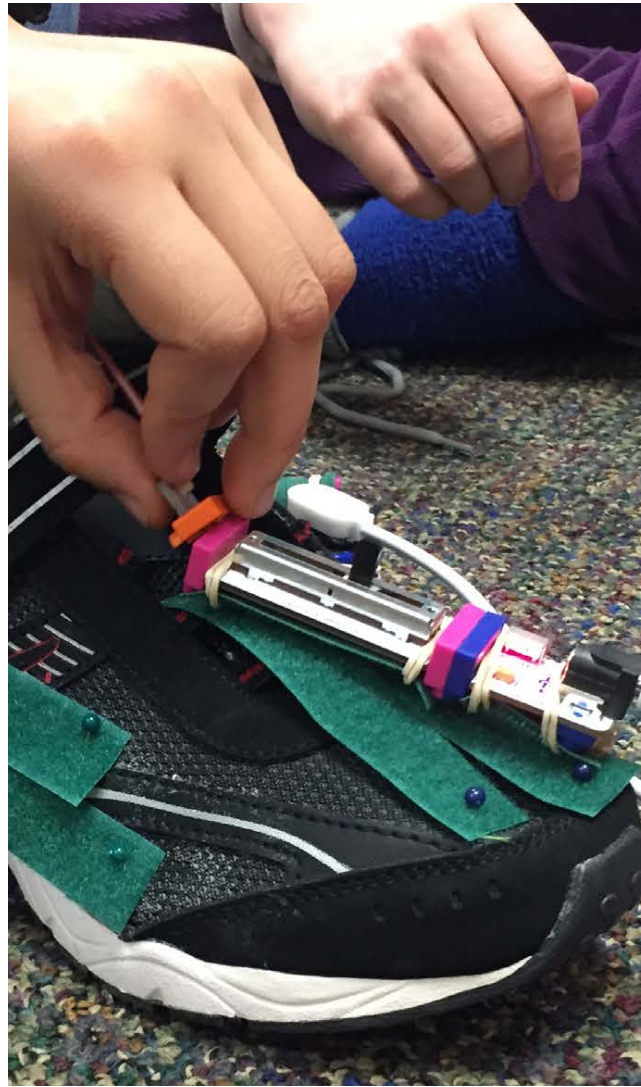
Communication

Programming

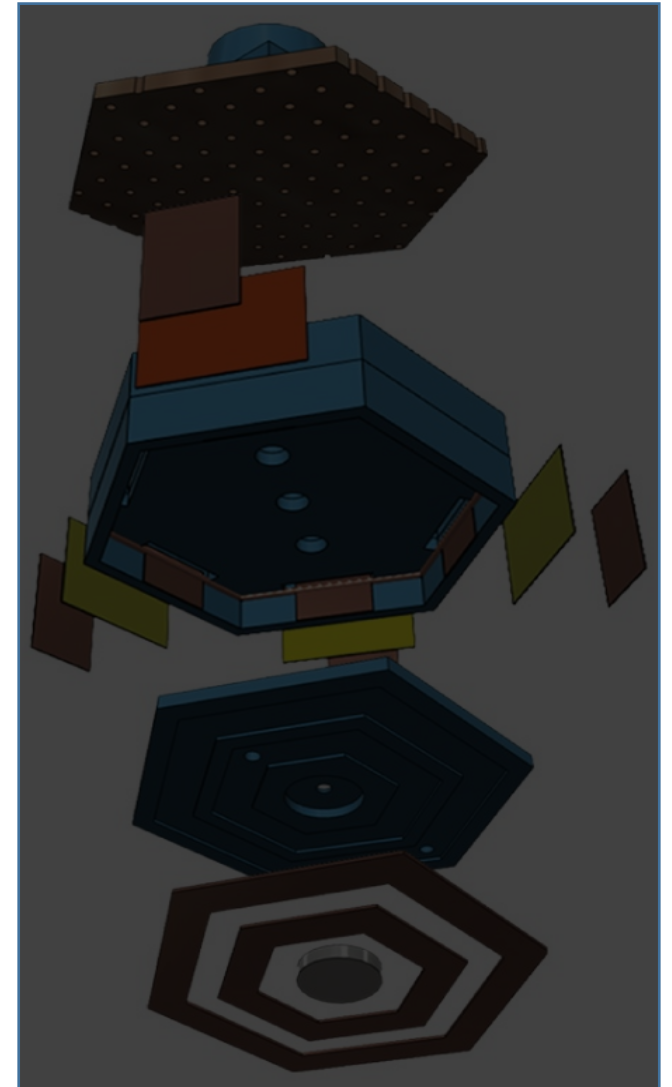




Co-design Session 1



Co-design Session 2



System Design

what children want to make on their shoes and **how** they want to do that

2nd Co-Design Session Method

Rapid Prototyping Design Activity





Part of the second co-design session where the team made a Morse-code shoe.

2nd Co-Design Session Outcomes

Make Noise when walk

Shoelaces Light-up in the Dark

Sound Activated Foot-Massaging

Air-Conditioner Shoes



Design Goals



Responsiveness



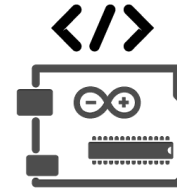
Self-Expression



Fun & Playfulness



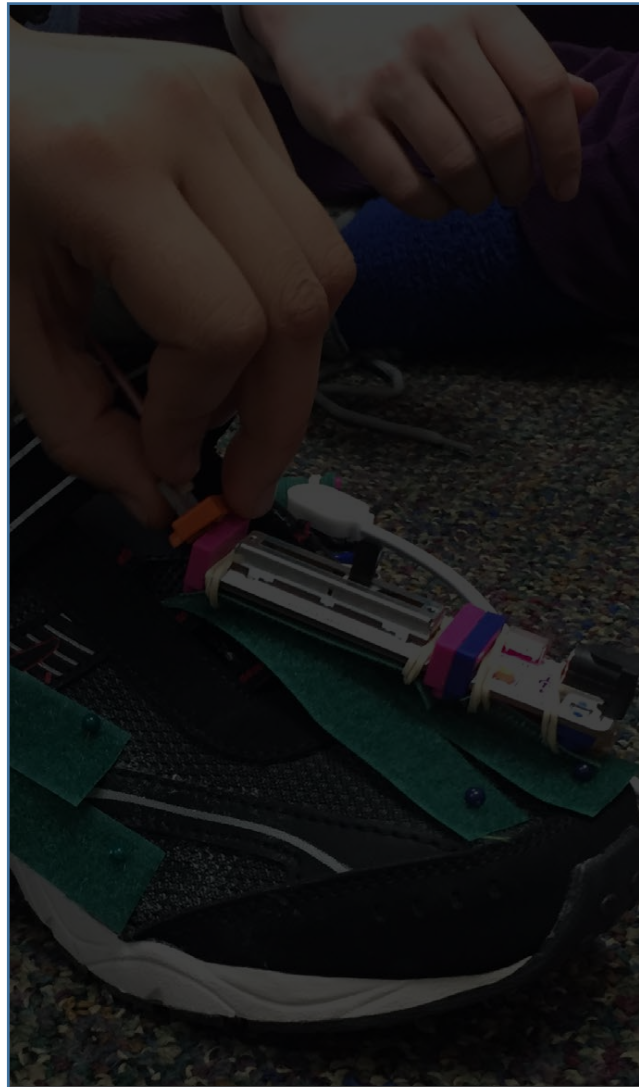
Easy & Accessible



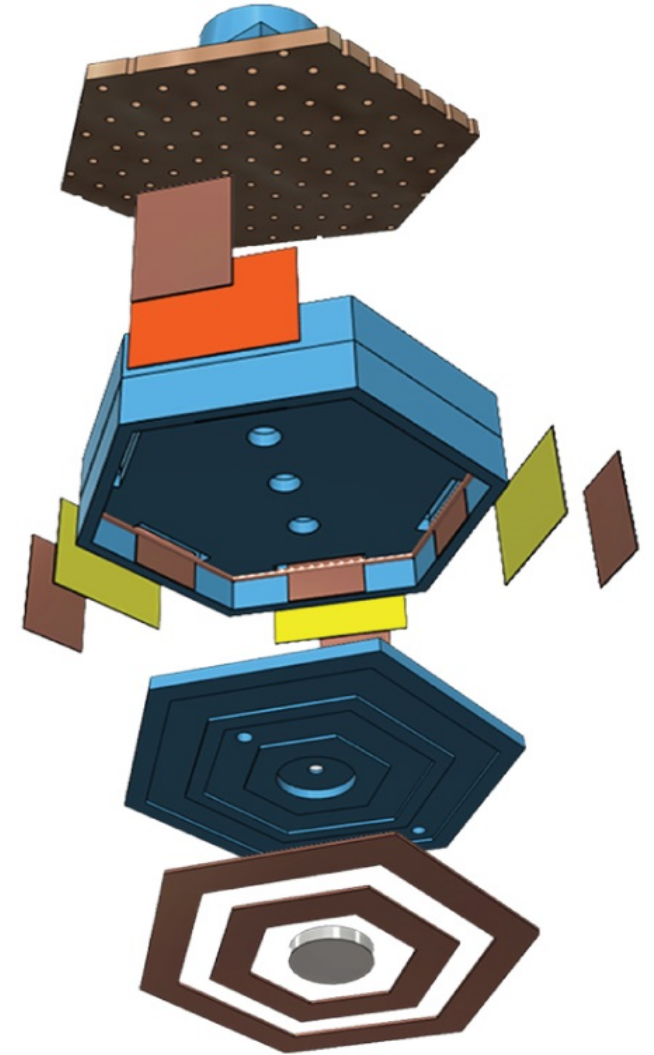
Programmable



Co-design Session 1



Co-design Session 2

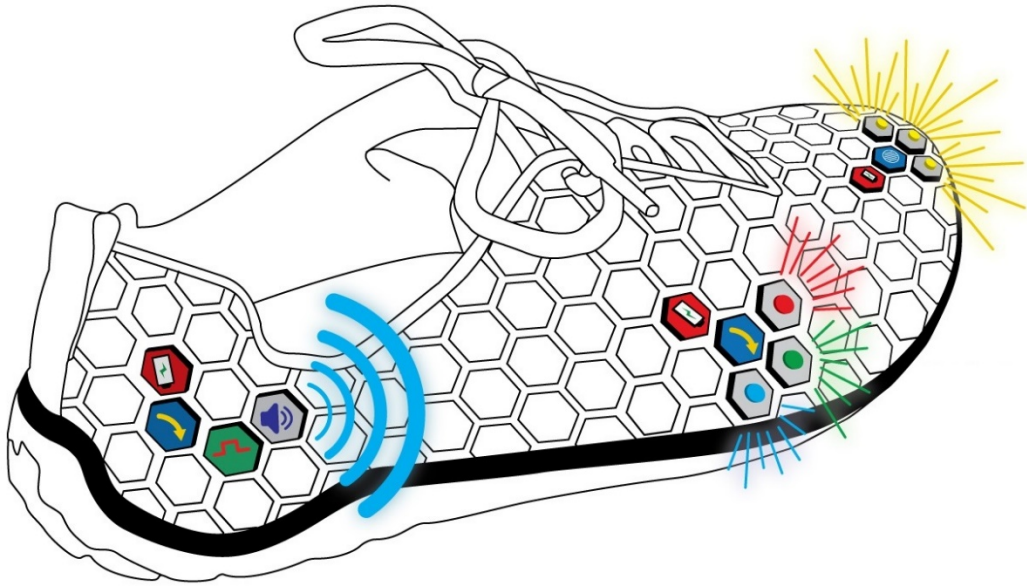


System Design

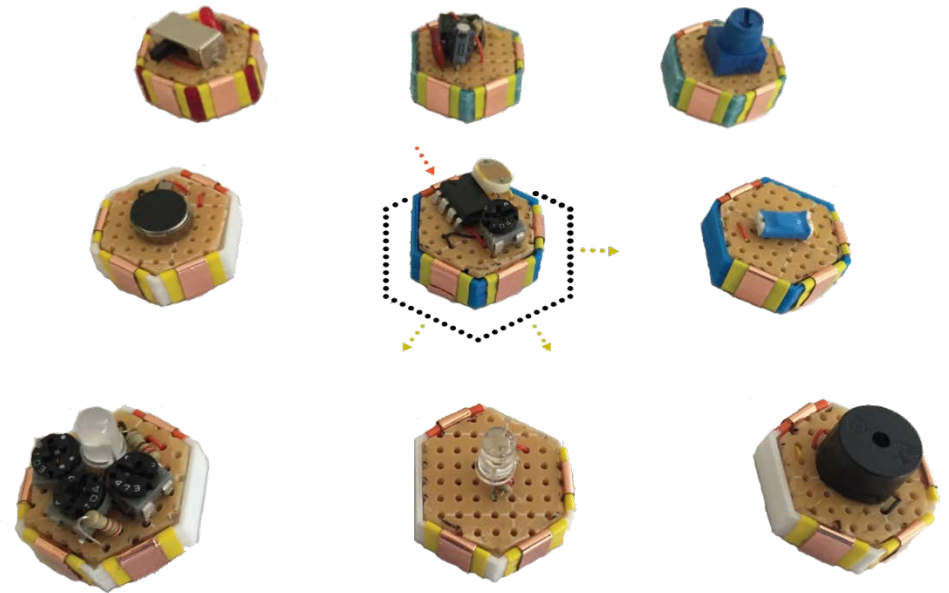
Current Prototype

System Design

E-Textile Shoe

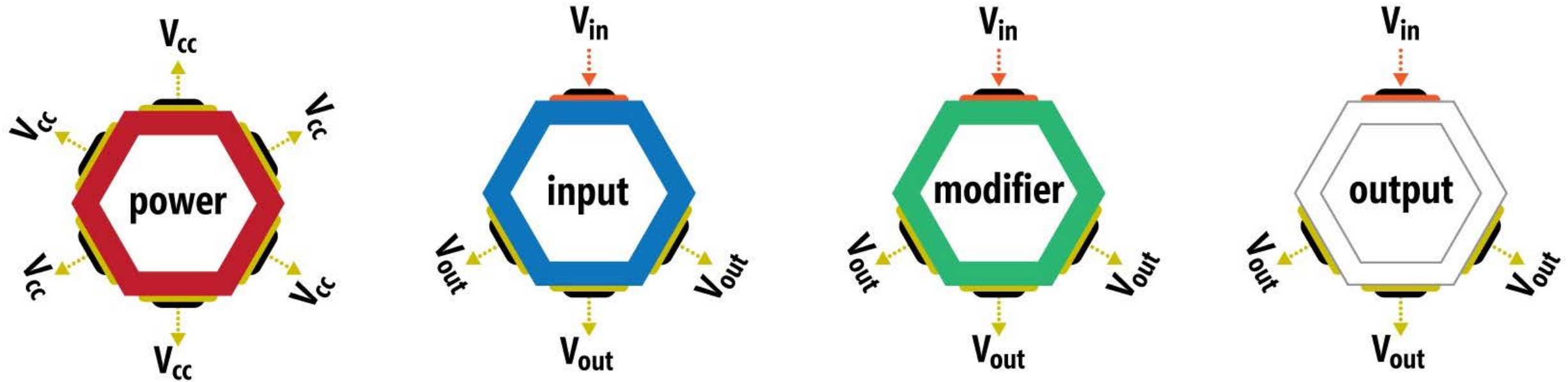


Magnetic Hexagon Modules



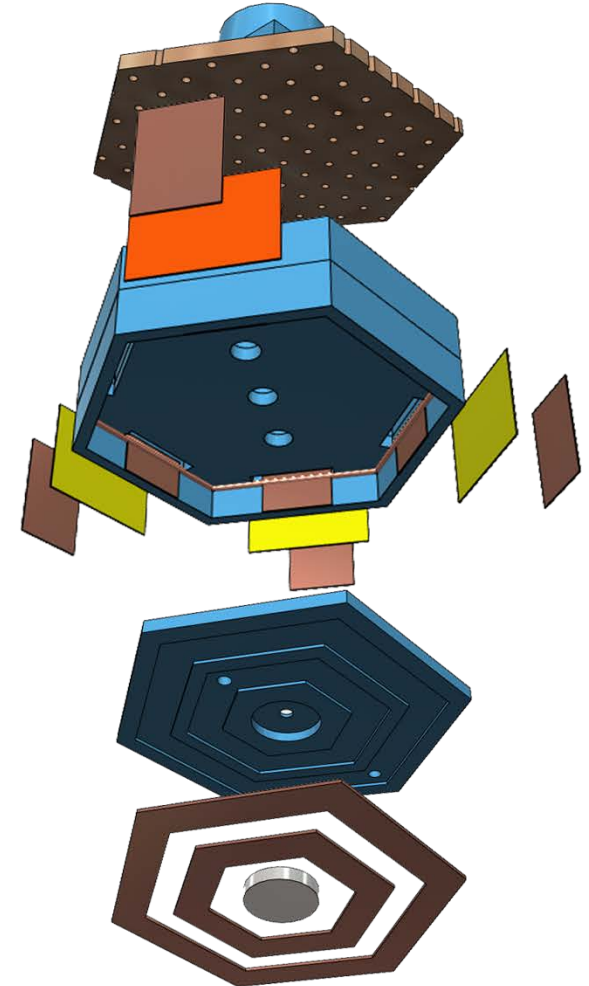
Four Types of Hexagon Modules

System Design



Hexagon Modules

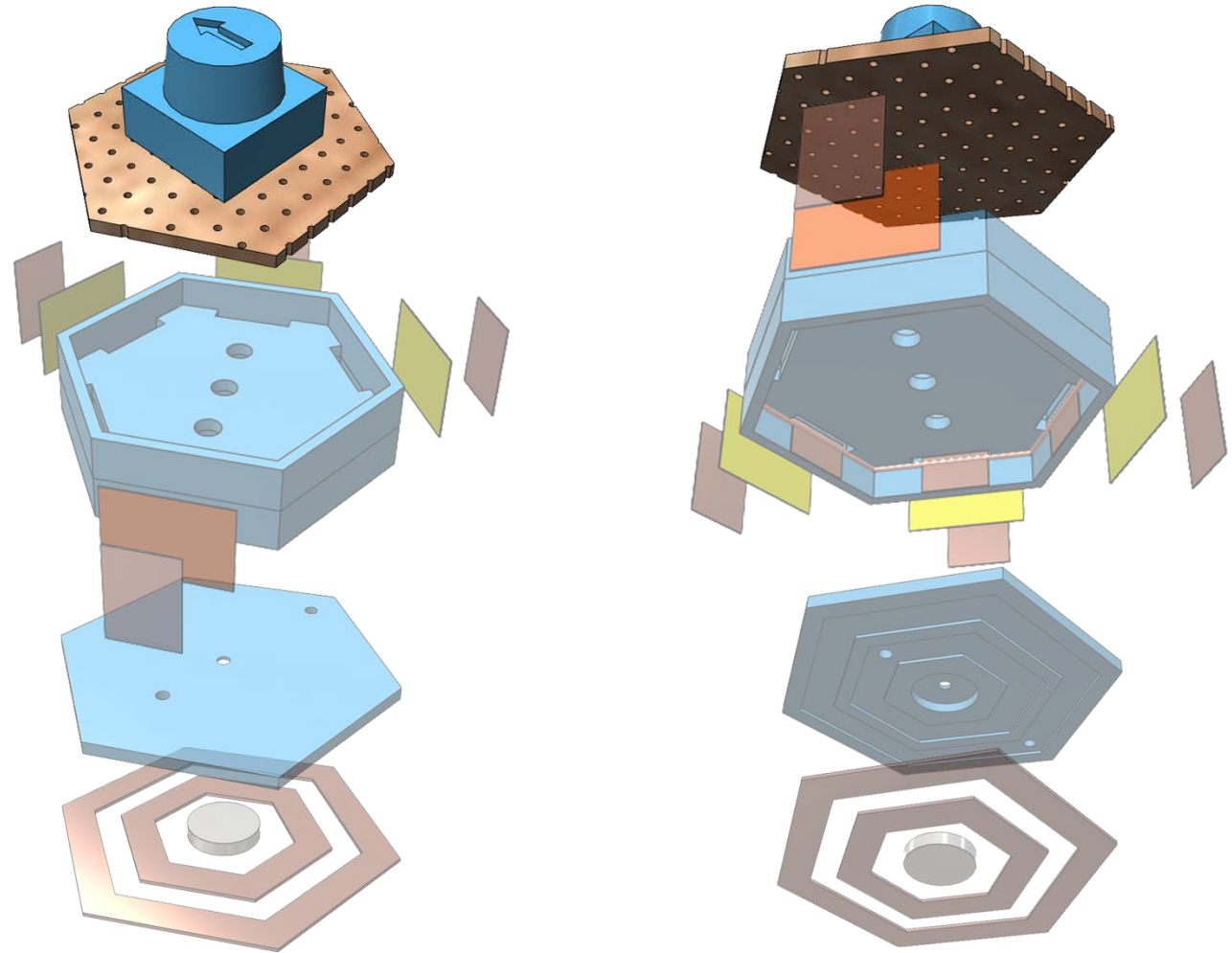
System Design



Hexagon Modules

System Design

Layer 1: Hardware

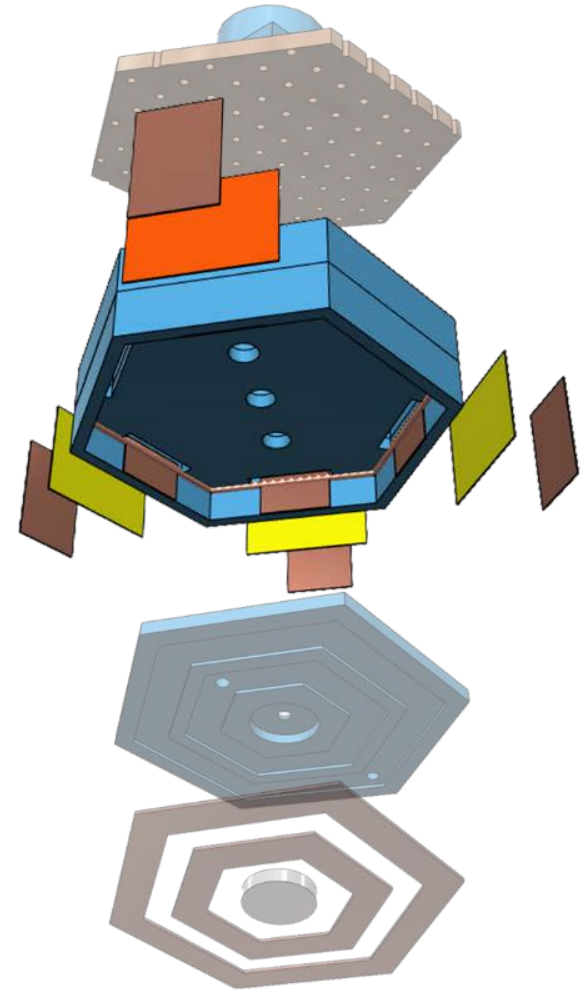


Hexagon Modules

System Design

Layer 1: Hardware

Layer 2: Shell



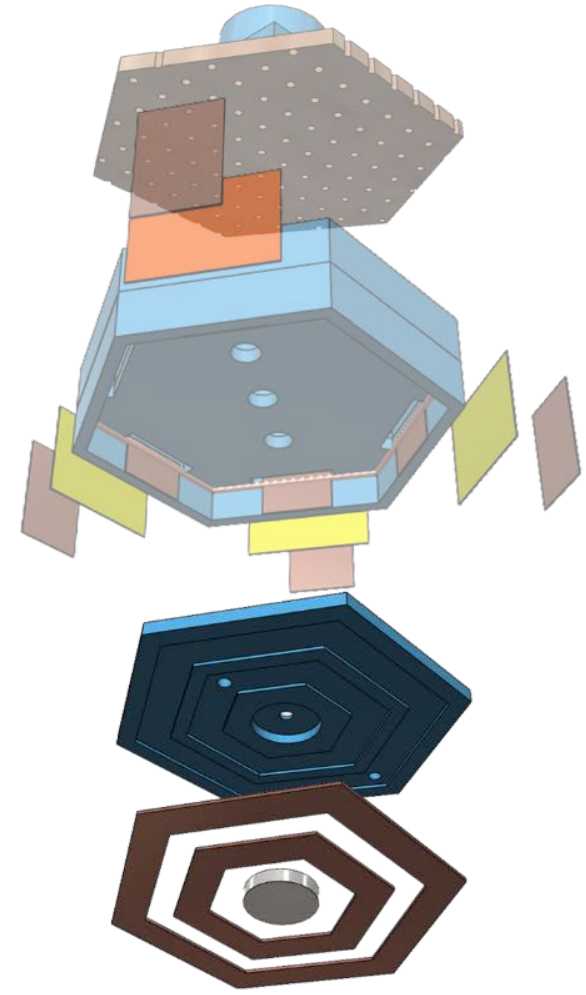
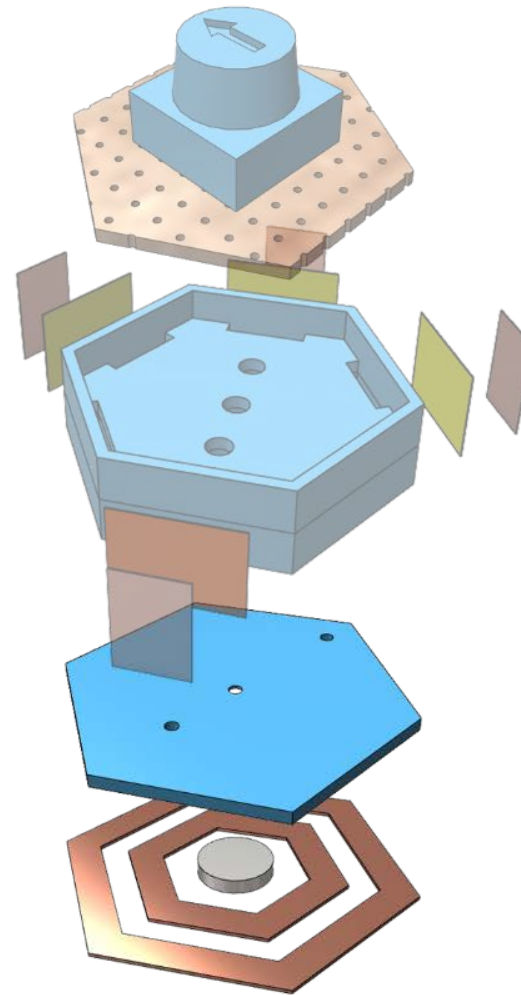
Hexagon Modules

System Design

Layer 1: Hardware

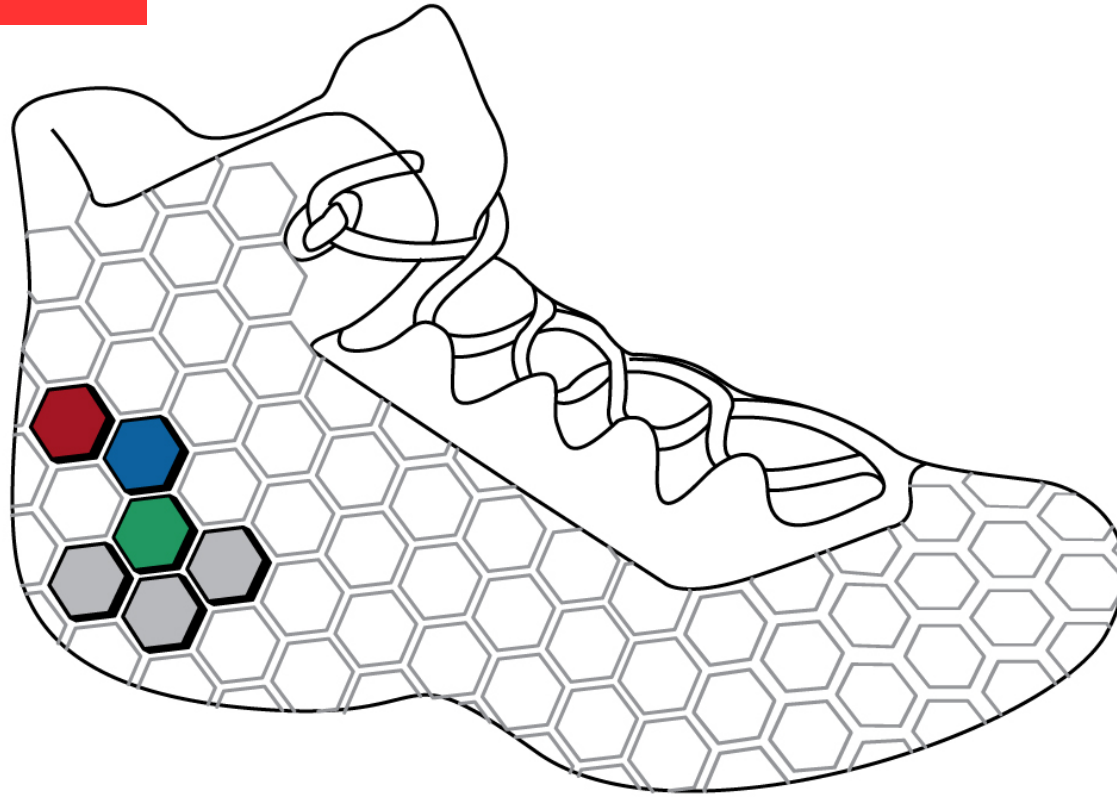
Layer 2: Shell

Layer 3: Conductive Cover



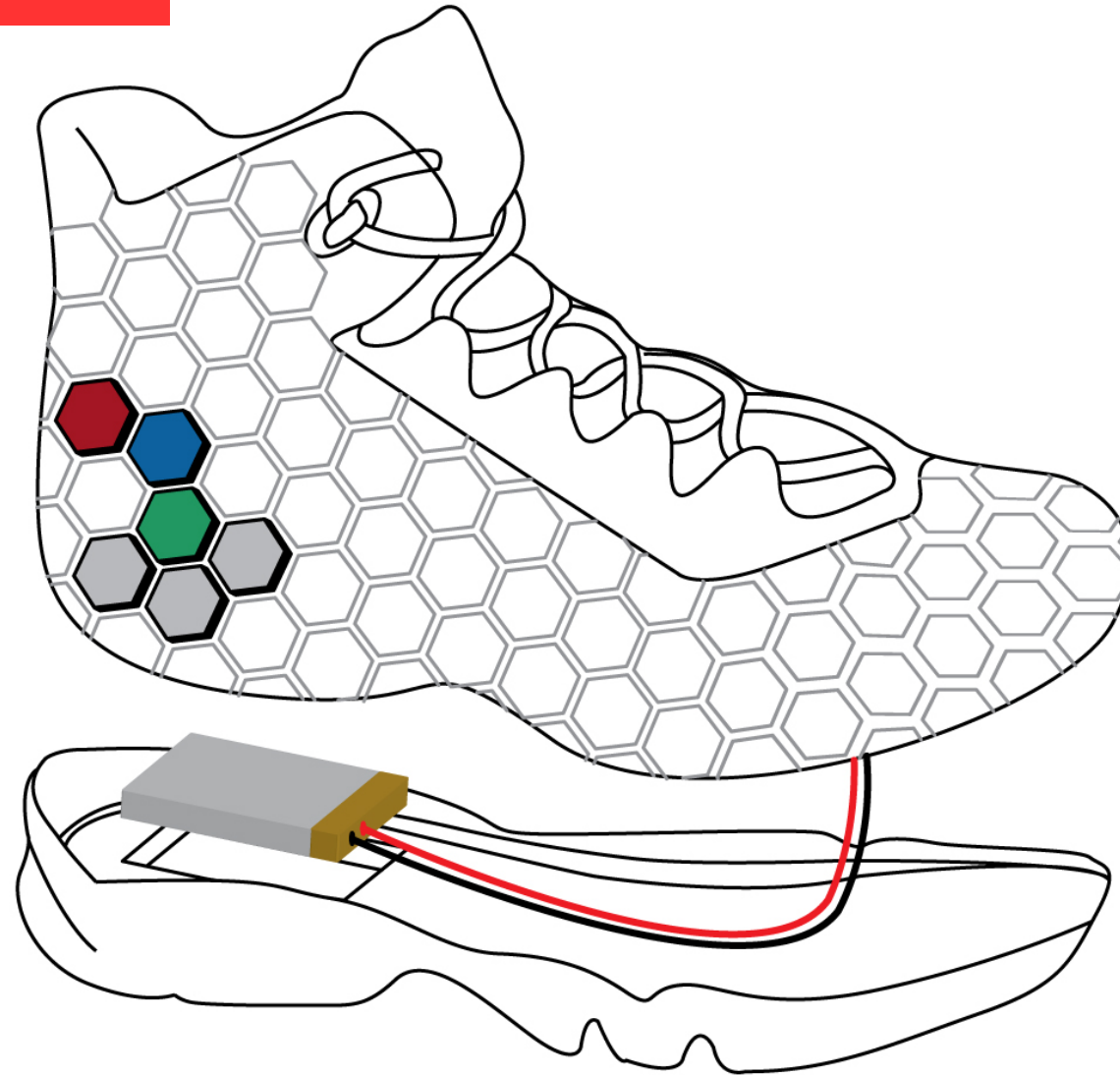
E-Textile Shoe

System Design



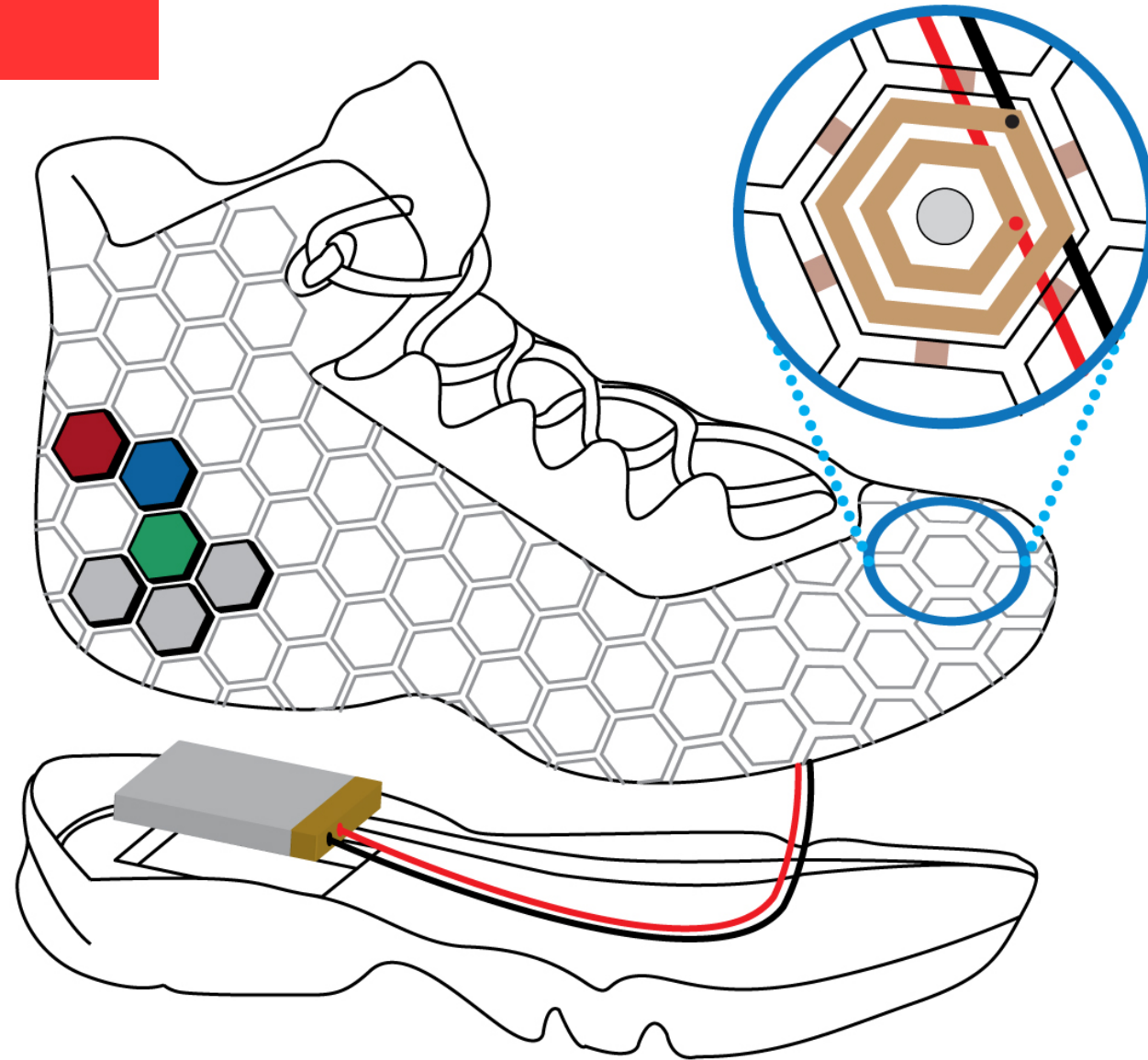
E-Textile Shoe

System Design



E-Textile Shoe

System Design



Self-Expression



Experiential
Learning About
Electronics and
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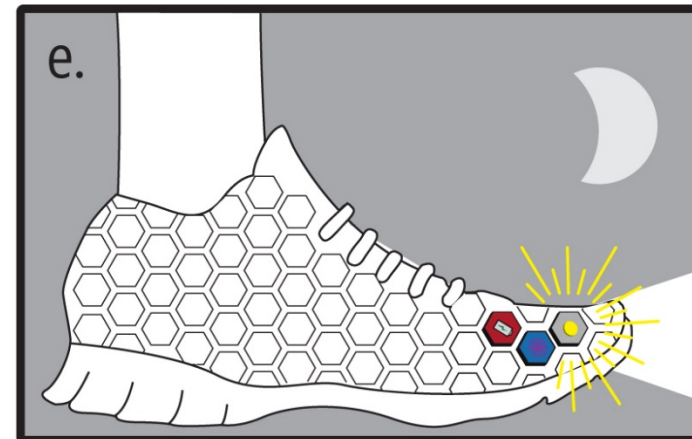
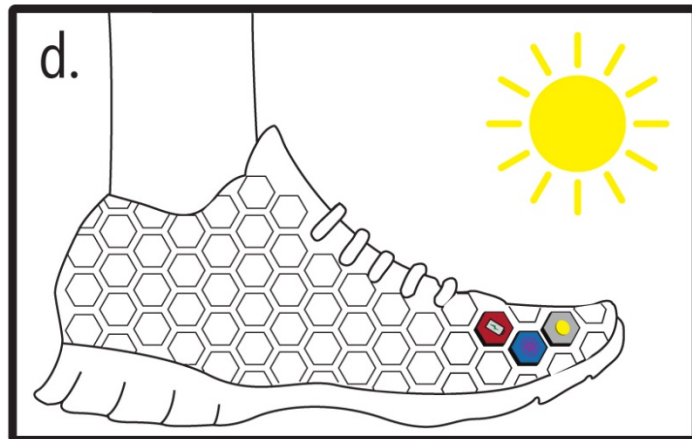
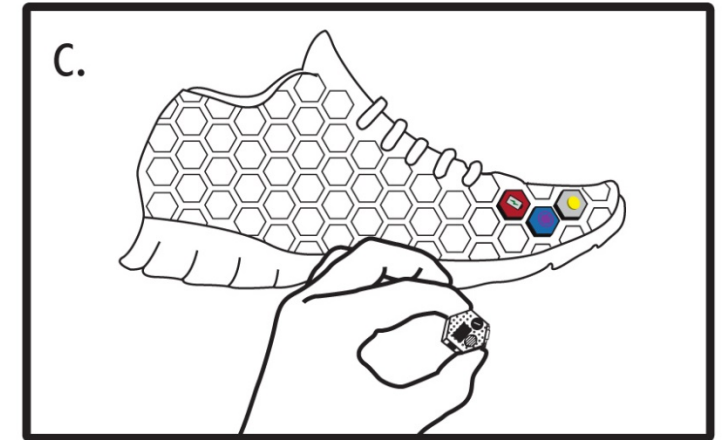
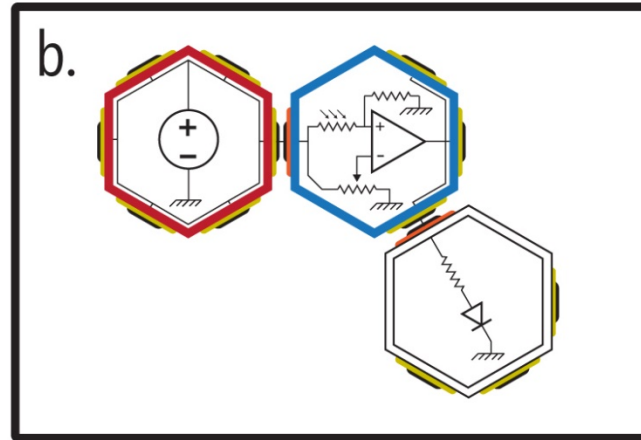
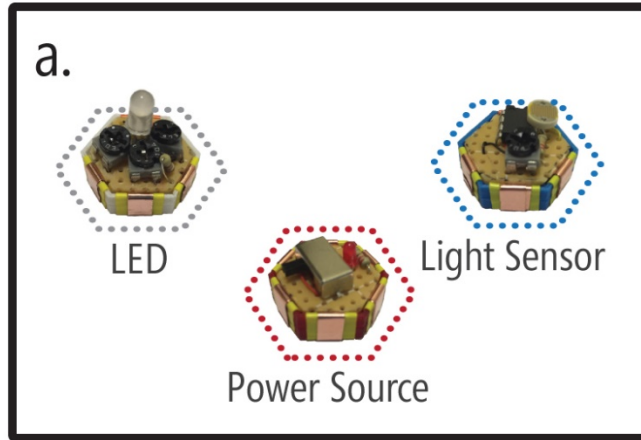


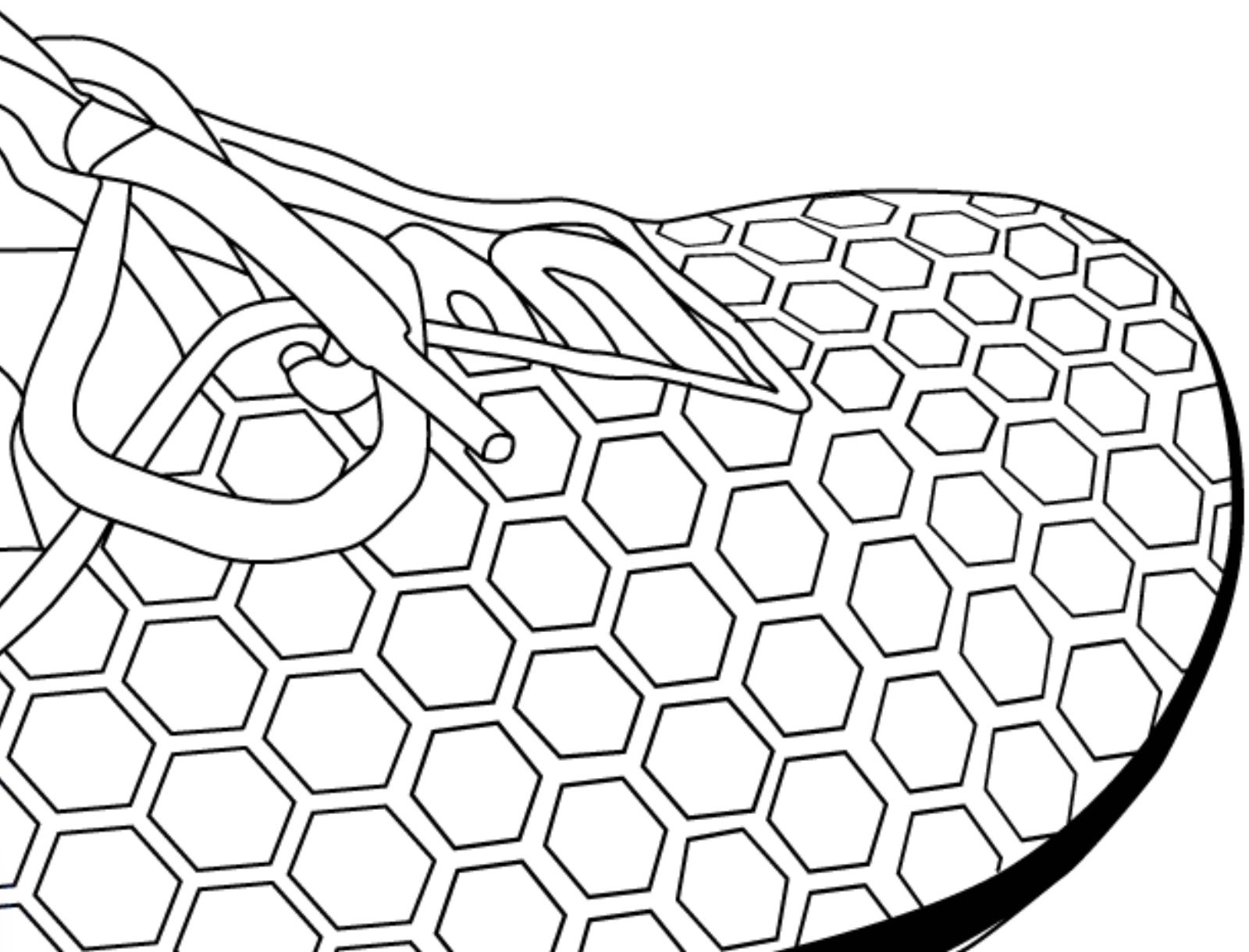
Provide Creative
Outlet Support



First Scenario: FlashLight Shoe

Scenarios





"Headlights"



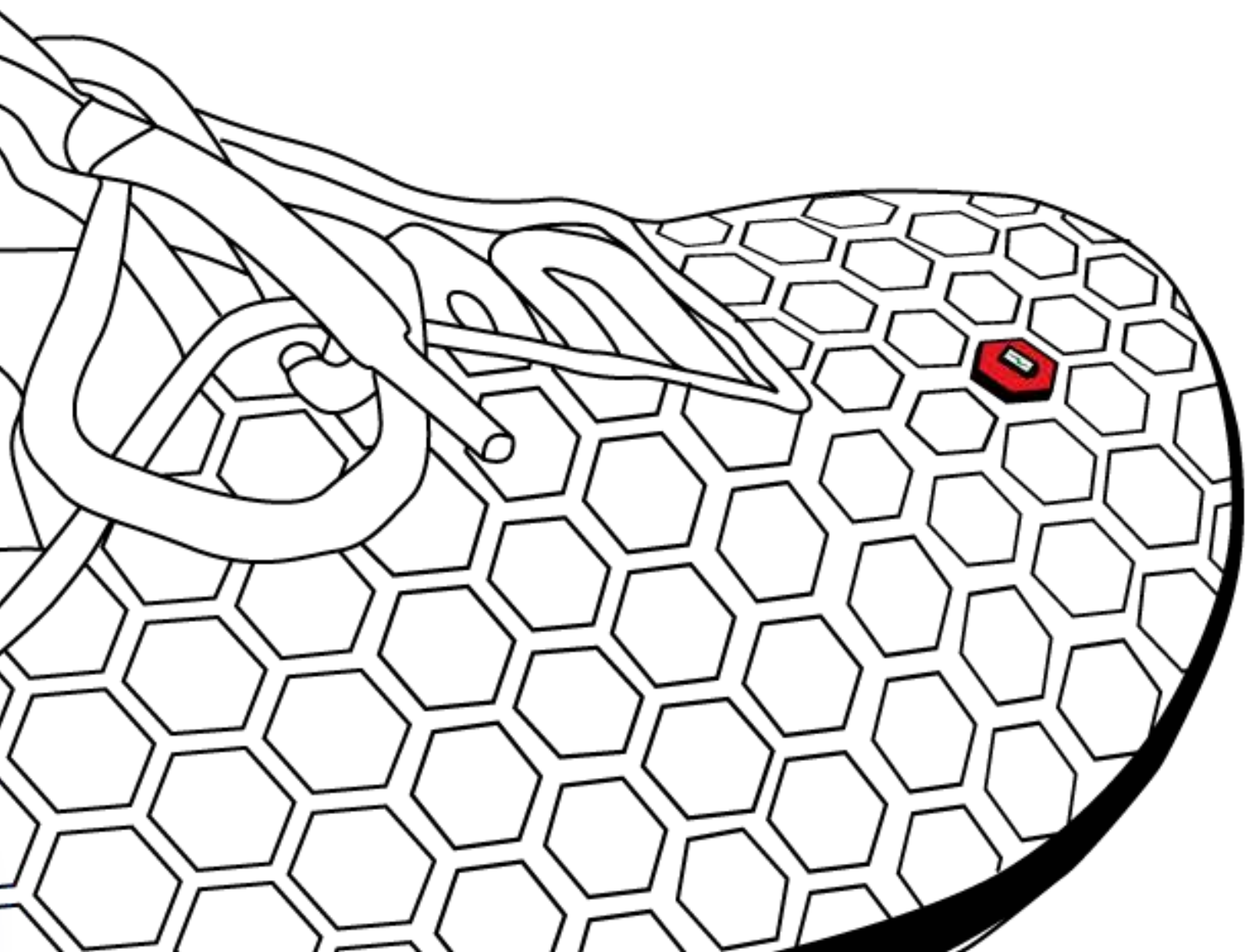
Power source



Light sensor



LED x 3



"Headlights"



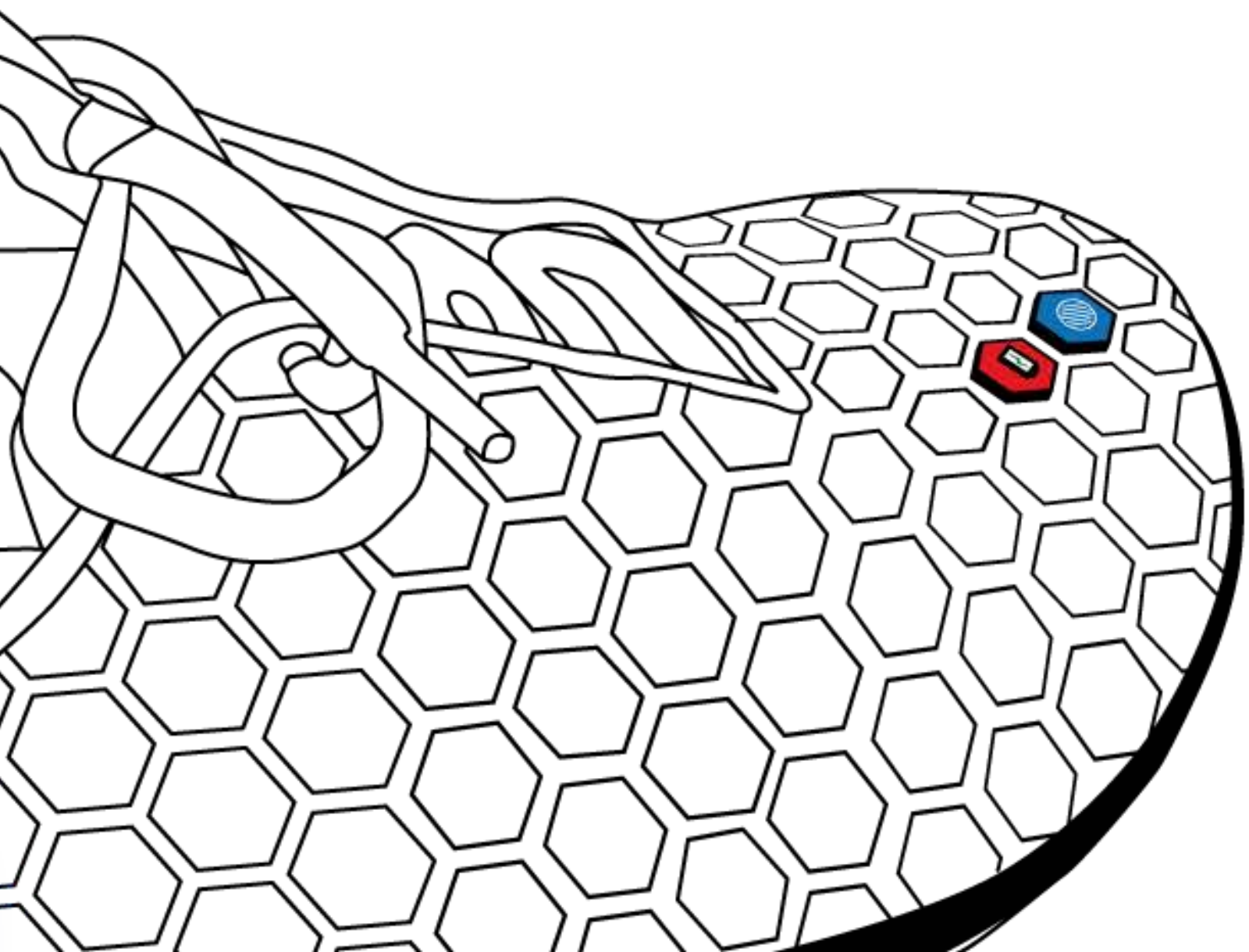
Power source



Light sensor



LED x 3



"Headlights"



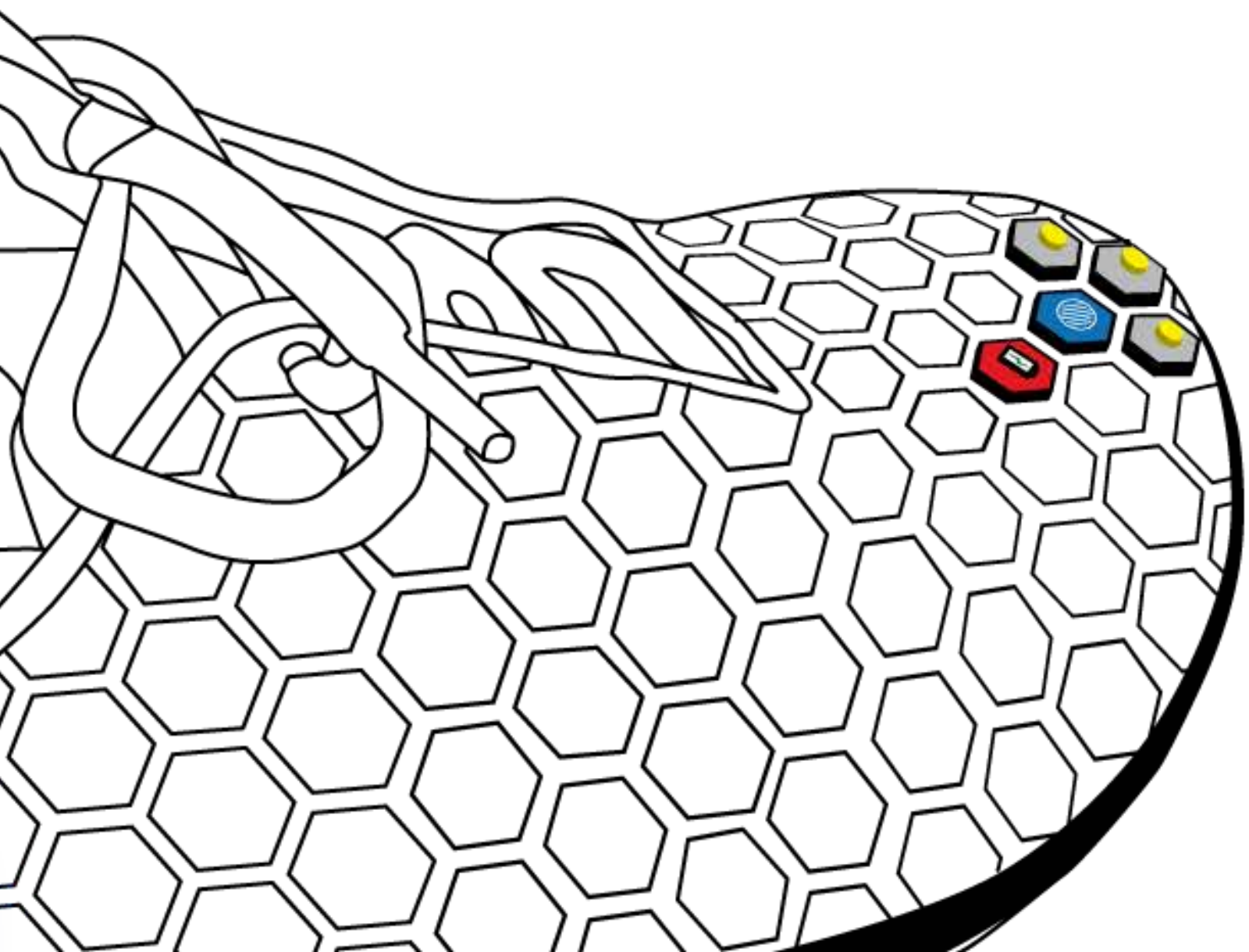
Power source



Light sensor



LED x 3



"Headlights"



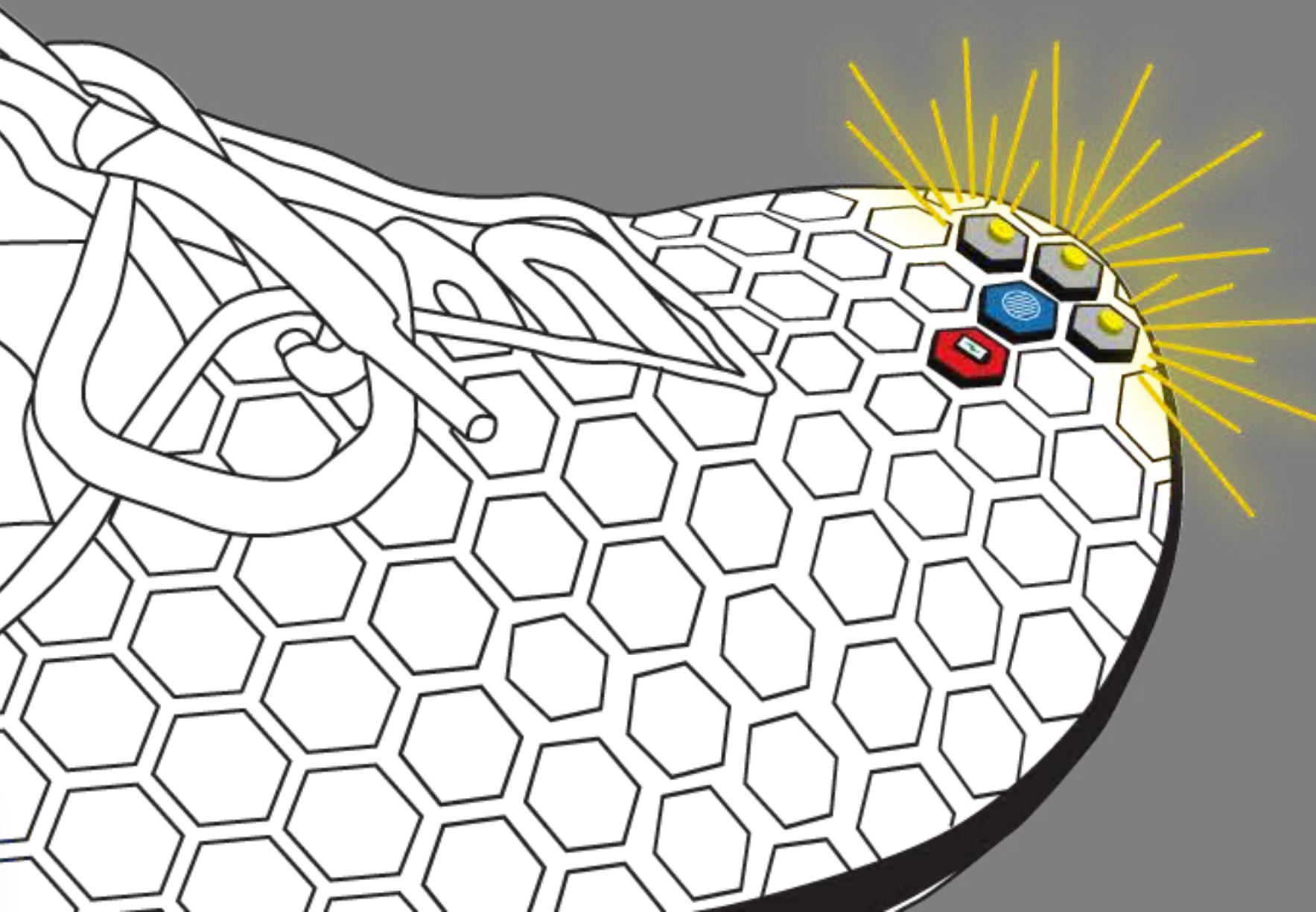
Power source



Light sensor



LED x 3



"Headlights"



Power source



Light sensor



LED x 3

MakerShoe is a new **e-textile construction kit** platform to support young children in **self-expression**, **experiential learning**, and **creative making**.

Future Plans:

Expand our module library based on our co-design sessions



Apply our approach to other worn objects besides shoes



Run more user studies with children



MakerShoe:

Towards an E-Textile Construction Kit to Support Creativity, Playful Making, and Self-Expression



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