



FLOWCIRCUITS

Executive Summary

- Flow Circuits is a design platform that replaces manual laboratory processes with “lab-on-a-chip” devices using microfluidics
- Microfluidics is a large but nascent industry (\$43B, 18% CAGR)
- Flow Circuits is 10x faster, half the cost, and twice as reliable as current methods
- We have early signs of traction, ready for growth



A Life Science Revolution Has Started!

Profluent releases AI-enabled OpenCRISPR-1 to edit the human genome

The open-source gene editor is freely available to license for commercial use and ethical research.

U.S. poised to approve first gene-editing treatment in breakthrough for sickle cell patients

PUBLISHED THU, DEC 7 2023-9:10 AM EST

Illumina ushers in \$200 genome with the launch of new sequencers



AlphaFold 3 predicts the structure and interactions of all of life's molecules

EMILY MULLIN SCIENCE FEB 2, 2024 7:00 AM

A Startup Has Unlocked a Way to Make Cheap Insulin

Problem: Protocol \neq Product

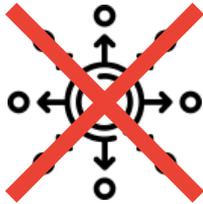
Life-saving life science innovation has a bottleneck in the lab.



Manual Processes



Limited Scale



Stuck in Central Lab



Microfluidics Enable Macro Scale

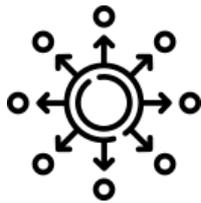
- Microfluidics is a technology for manipulating tiny amounts of fluid.
- We use microfluidics to replace manual laboratory processes with “lab-on-a-chip” devices.
- Now we can automate, scale, and decentralize life sciences!



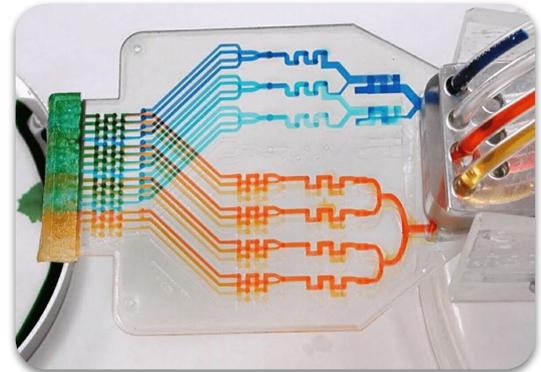
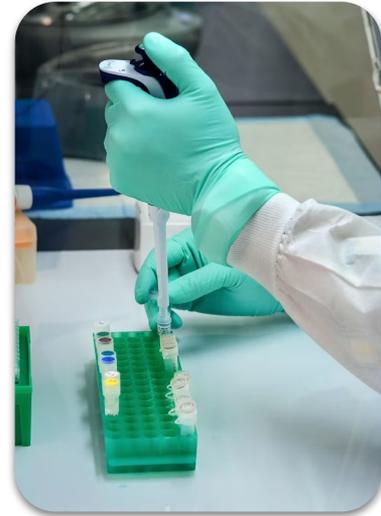
Automated
Processes



Massive
Scale



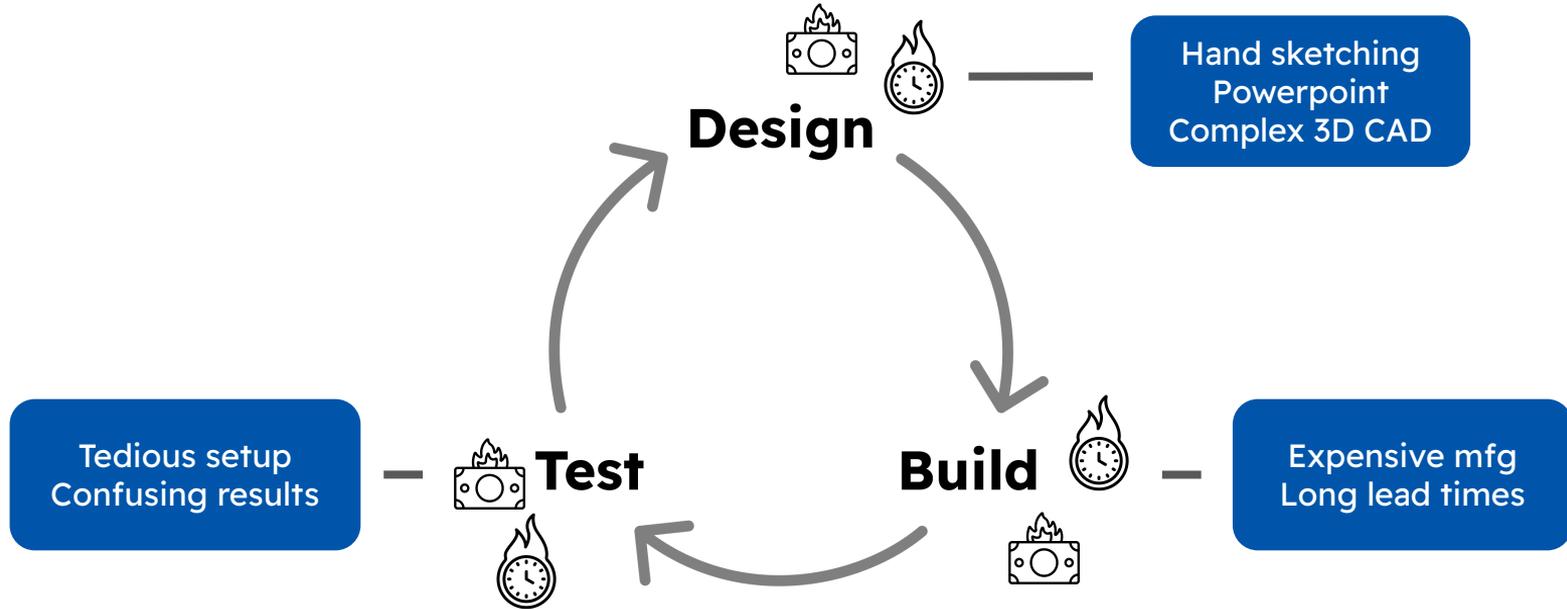
Widely
Distributed





Microfluidics is Broken

The potential is unrealized due to the “Microfluidics Cycle of Despair”

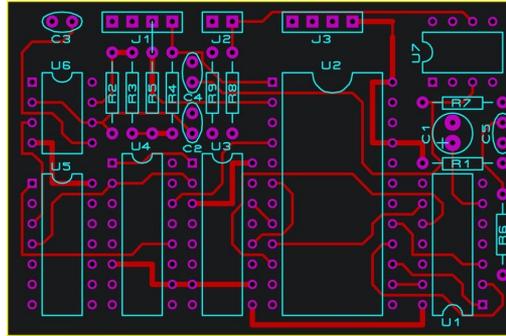
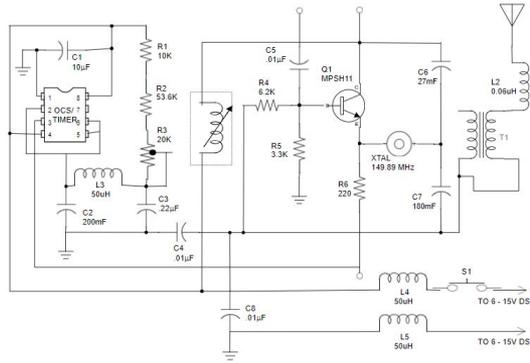


Years of work! Millions of dollars!

If Only There Was A Better Way...



Electrical engineers succeed with a PCB design ecosystem



Design



Test

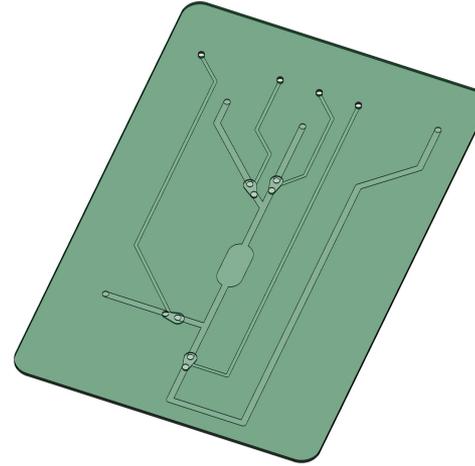
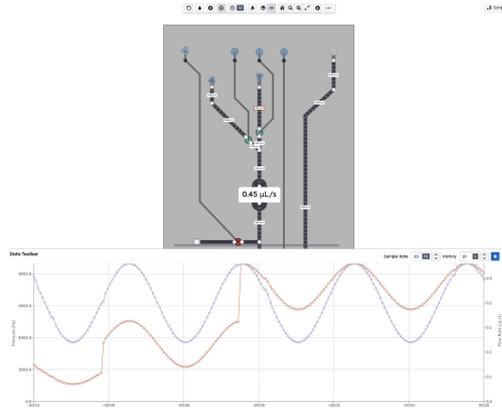
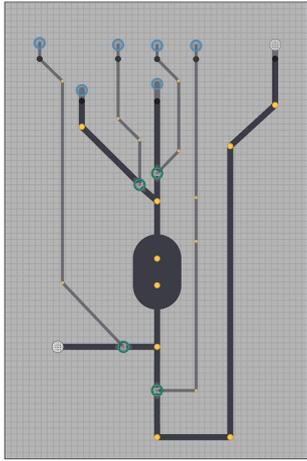


Build



Done!

Flow Circuits Fixes Microfluidics!



Design



Test



Build



Done!

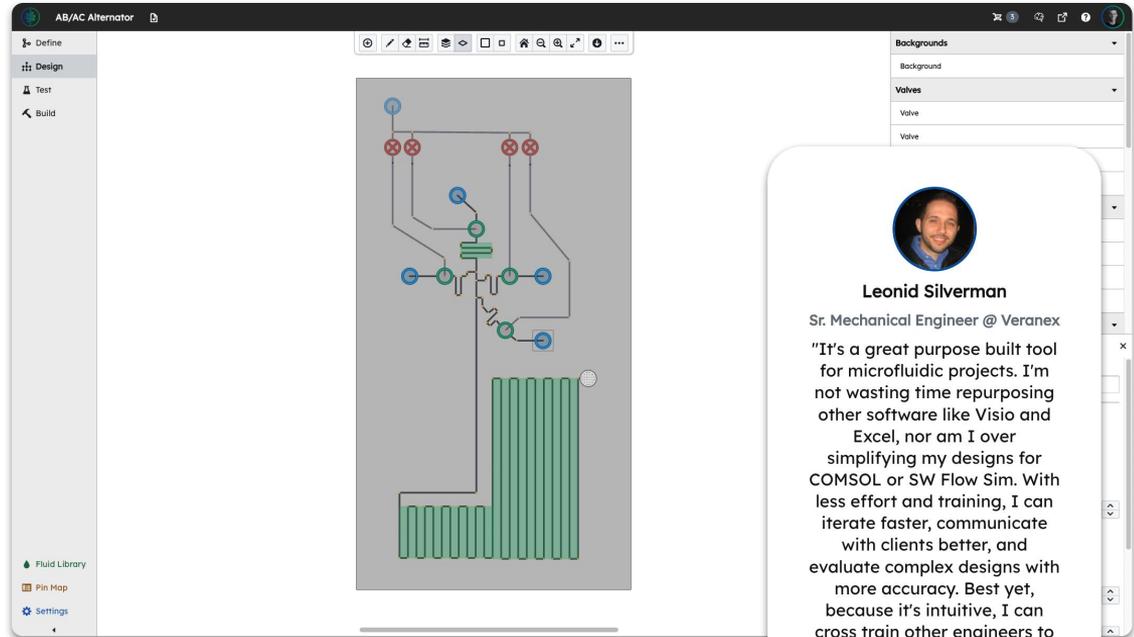
3 hours of work! <\$1k! Easy!



How: An Integrated Platform

MVP+ is Live!

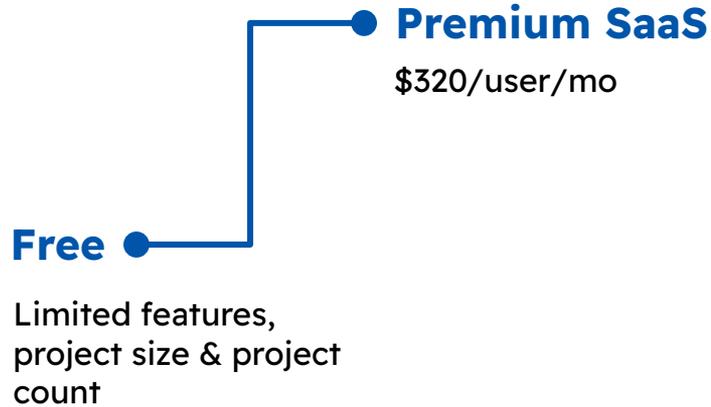
Flow Circuits is a complete and collaborative cloud-based fluidics platform to *design*, *test*, and *build* your device in one place.



Our Business Model and Strategy



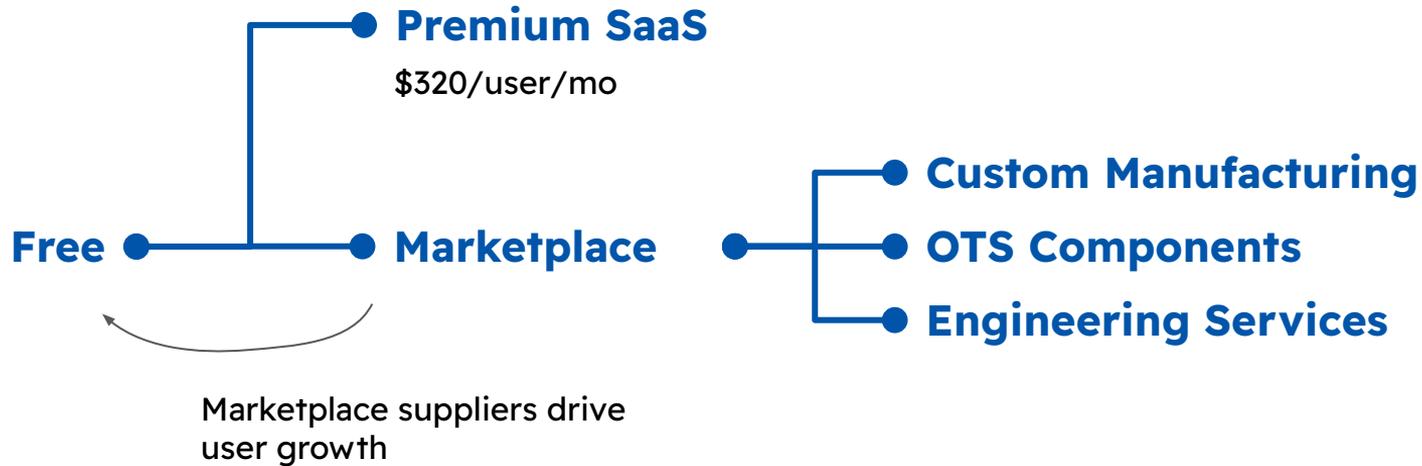
Our free platform connects users to our Premium SaaS offering



Our Business Model and Strategy



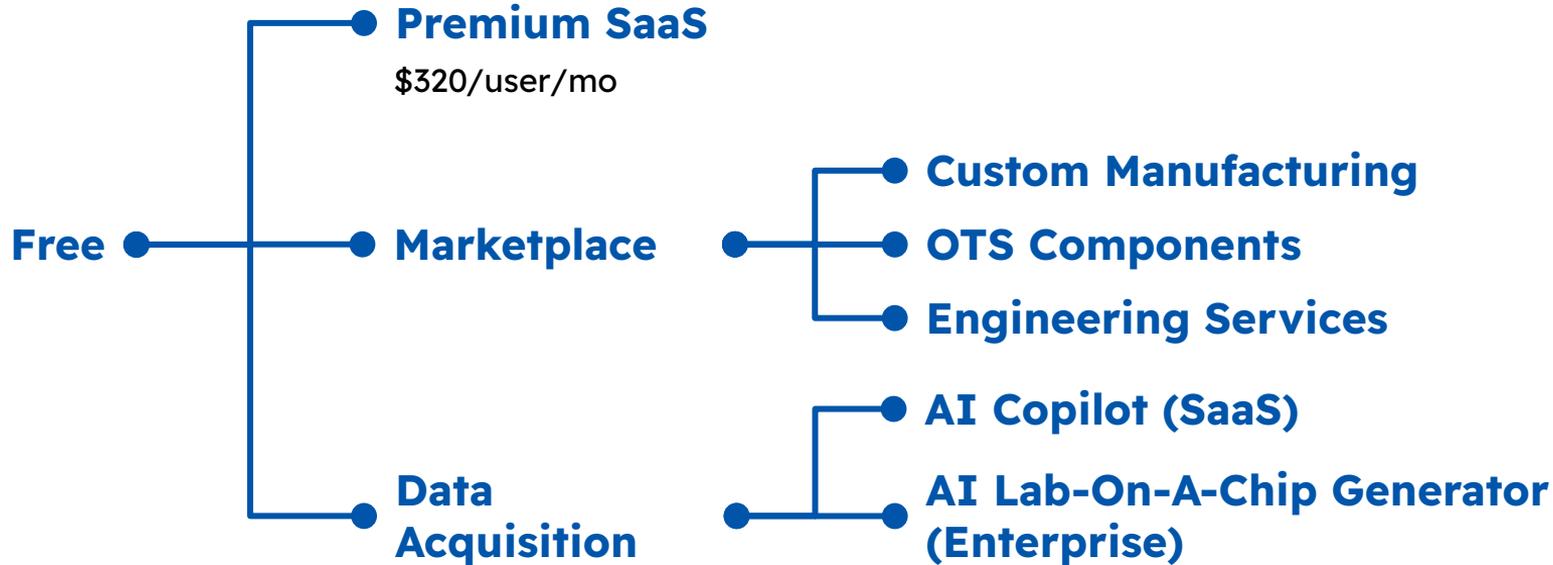
We are building a single destination for microfluidics solutions leveraging a network of partners



Our Business Model and Strategy



We are building the largest microfluidics data set on the planet to become the final layer in the life sciences tech stack.



We Have Massive Potential

SaaS Opportunity

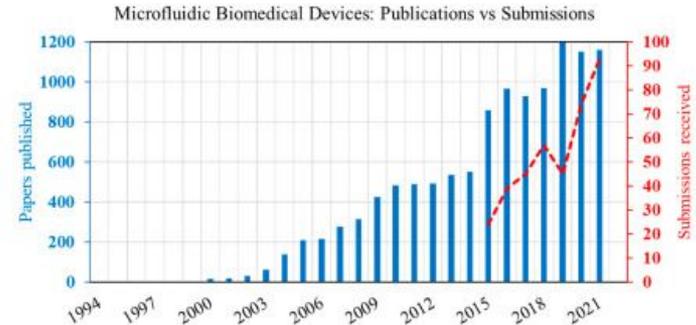
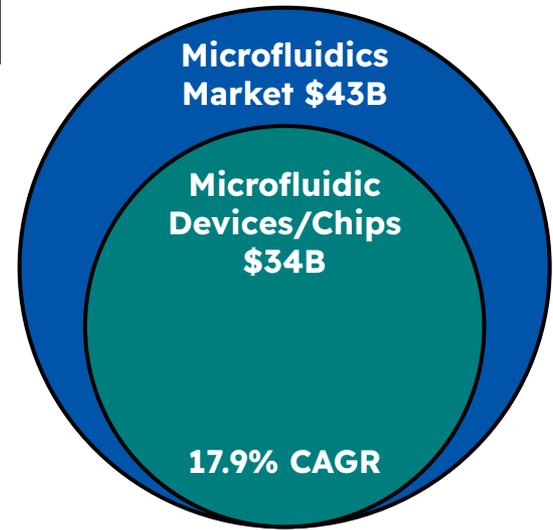
- Microfluidics originated with academic research. Now transitioning into commercial phase with **significant unmet needs** in specialized tools and software.

Versatile Applications

- Therapeutics
- Diagnostics
- Drug Discovery

Untapped Potential

- Microfluidics has previously been overlooked because of design difficulty.



[Insight Partners](#), [NIH](#)

Milestones



Ubiquitous
Design Platform,
1,000+ Users

Q4 2024



Marketplace +
Order Now

Q2 2025



Advanced
Simulations,
Hardware
Integrations,
4,000+ Users

Q4 2025



AI-Powered
Lab-on-a-Chip
Generator,
15,000+ Users

Q4 2026

Team



Andrew Krippner - CEO & Founder

- Ex-Toolbox Medical Innovations (Acquired by TE Connectivity)
- Ex-Biological Dynamics
- HVAKR: Vertical SaaS platform for HVAC engineering design
- BSME California Polytechnic University SLO
- 9+ Years Product Development Fluidic Consumables/Instruments:
 - [DNAe LiDia SEQ](#)
 - [Hound Labs Marijuana Breathalyzer](#)
 - [Curate Cell Processing System](#)
 - [Biological Dynamics ExoVerita Pro](#)
 - [Thermo Fisher Accula SARS-CoV-2 Test](#)



Mike Glanz - Investor & Advisor

- Ex-Founder/CEO HireAHelper (Marketplace)

Miguel Hernandez - Investor & Advisor

- Ex-CFO UltiSat (Technology)



Financing



Investment	SAFE Note
Size	\$1M
Key Terms	\$6M post-money valuation cap
Use of Funds	Go To Market, Key Hires (Business Development)
Expected Close	Q3 2024

Thank you!

✉ Email: andrew@flowcircuits.com

📅 Meet: flowcircuits.com/calendar

🌐 Website: flowcircuits.com

🌐 LinkedIn: linkedin.com/company/flowcircuits



Q+A

Early Traction

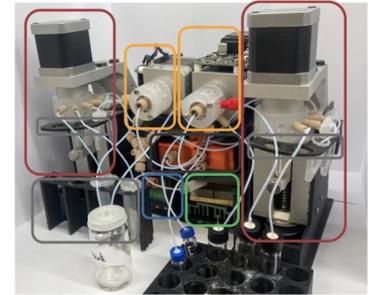


Users	336, 4% paid
ARR	\$53k
Est. LTV	\$9,250
NPS	58

What is a Flow Circuit?

“A network of fluidic components connected through fluid channels to facilitate a useful process”

- Pumps (Syringe, Peristaltic, Piezo, Vacuum, etc.)
- Valves (Pinch, Rotary, Membrane, Solenoid, Check Valves, etc.)
- Chambers (Input, Output, Mixing, Blister, etc.)
- Filters
- Fluid Sensors (Optical, Ultrasonic)
- Flow/Pressure Sensors
- Optics
- Flow Cells/Electronics Integration
- Magnets
- Heaters



What are Flow Circuits used for?



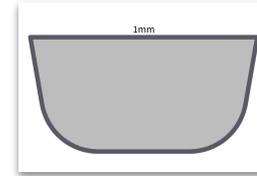
These devices are currently used in the market in many important life science applications:

- In Vitro Diagnostics/Molecular Assays
- Life Science Research/Drug Discovery
- Synthetic Biology/Biomanufacturing
- Lab-on-a-chip, Organ-on-a-chip
- Personalized Medicine
- Genomics

Product: Design



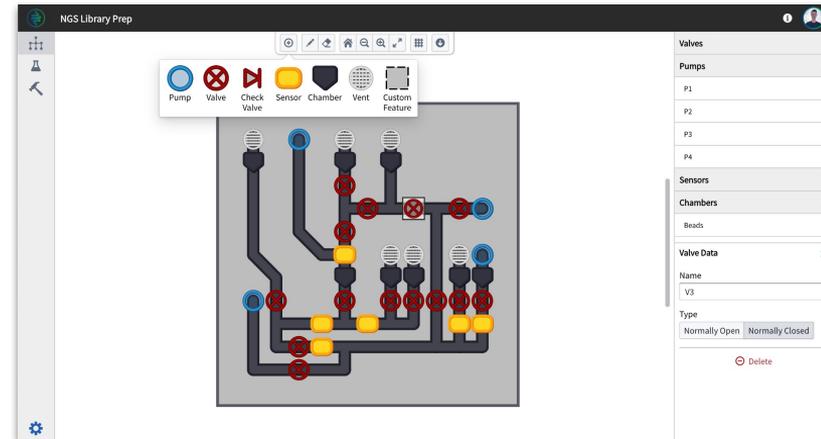
- Draw Fluid Channels
- Drag and Drop Fluidic Components
- Volume Sizing and Layout
- Define Channel Cross Sections
- Multi-Layer Functionality
- Fluid Library
- Real Time Collaboration
- Configurable and Customizable
- Easy changes w/o broken design intent
- Integrated OTS Component Selection



Fluid Library

Name	Viscosity	Color
Pretreatment	1.000 cP	
Sample	1.000 cP	
Wash	1.000 cP	

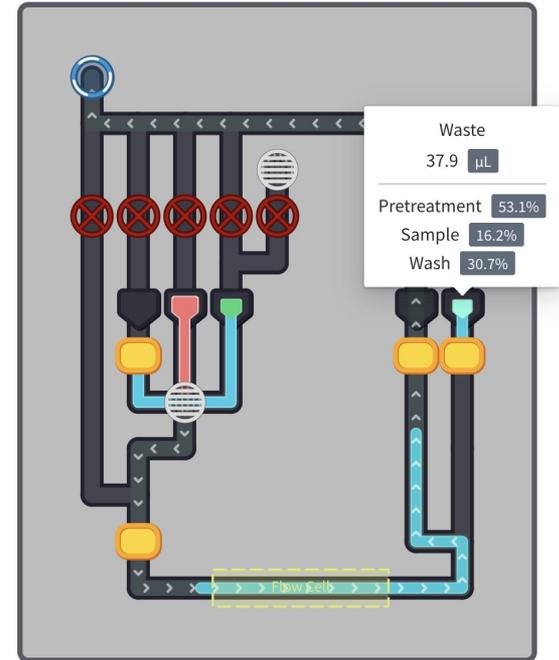
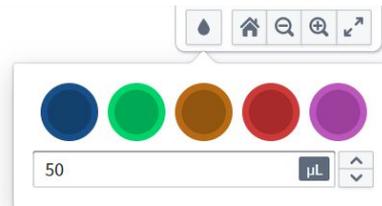
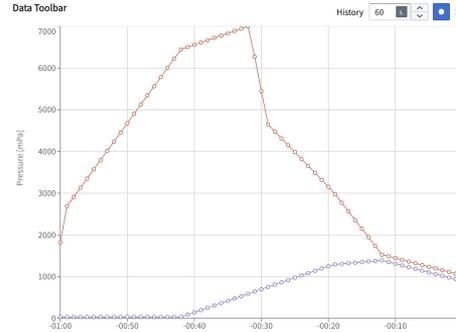
[Create New Fluid](#)



Product: Test



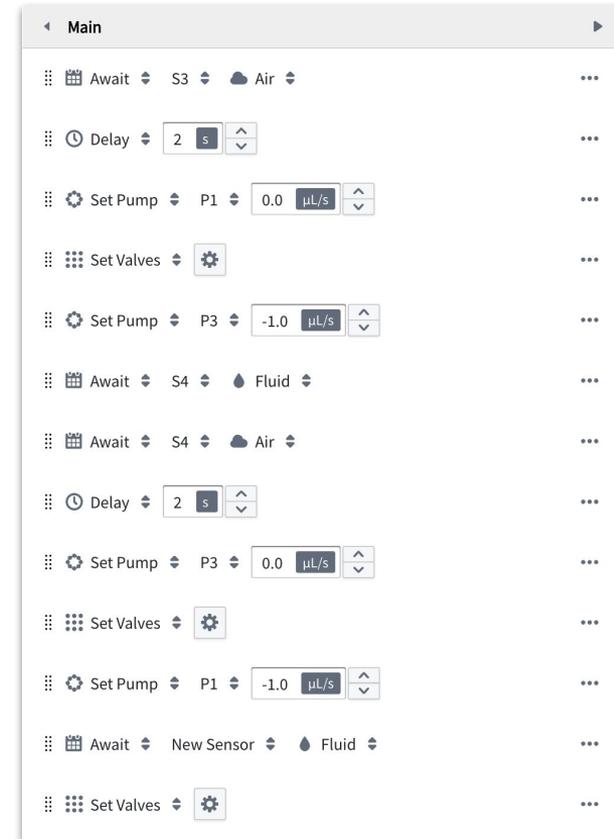
- Interactive Components
- Visualize Open Flow Paths
- Drag and Drop Fluid Volumes
- Simulate Fluid Flow
 - Hagen-Poiseuille Equation
 - Young-Laplace Equation
- Inspect Fluid Volumes in Real Time
- Pressure Charting and Export
- Identify Design Errors Instantly



Product: Scripting



- Visual Programming Language
- Test Instantly With Simulation
- Intuitive Commands
- Consistent Playback
- Tune In Timing Between States
- Program Subscripts
- Drag and Drop Ordering
- Export and Reuse as Instrument Controller

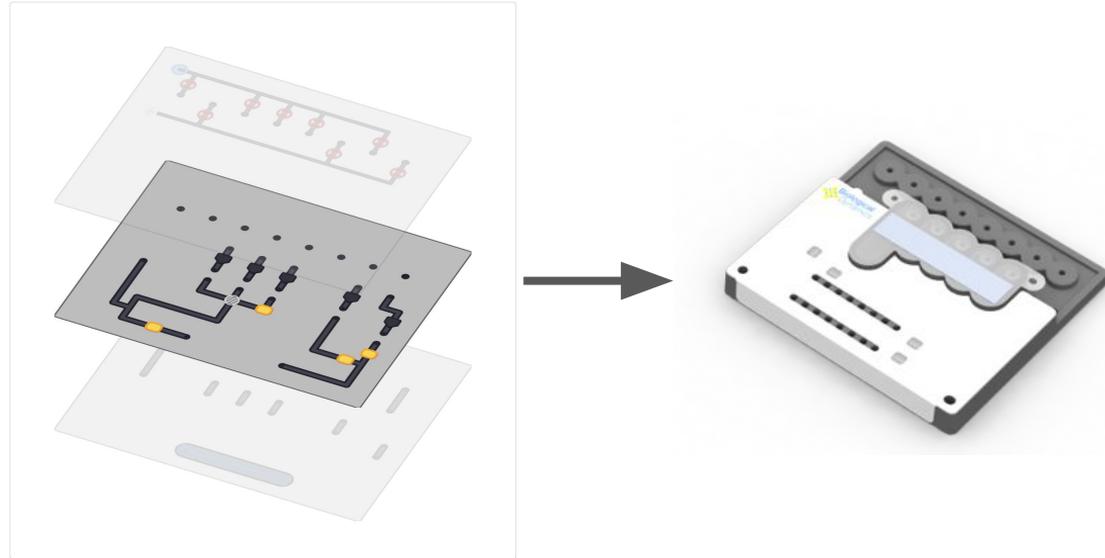


Product: Build



We offer a systemized translation of the designed schematic to final products in many architectures. We monetize this as a marketplace:

- Injection Molding
- 3D Printing
- Laminate Assembly
- Machined Manifold
- PDMS
- OTS Components
 - Pumps
 - Valves
 - Sensors
 - Tubing
 - Connectors



Competitive Landscape



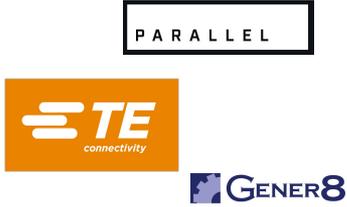
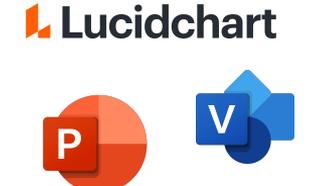
We are the first microfluidics design platform!

Software

- Some highly specialized and expensive CFD tools (Ansys, COMSOL)
- Product “Hacking” (PowerPoint, LucidChart, Visio)
- Drawing Tools (3DuF, Fluiddevice)

Design Services

- Product Development Organizations (TE, Gener8, etc.)

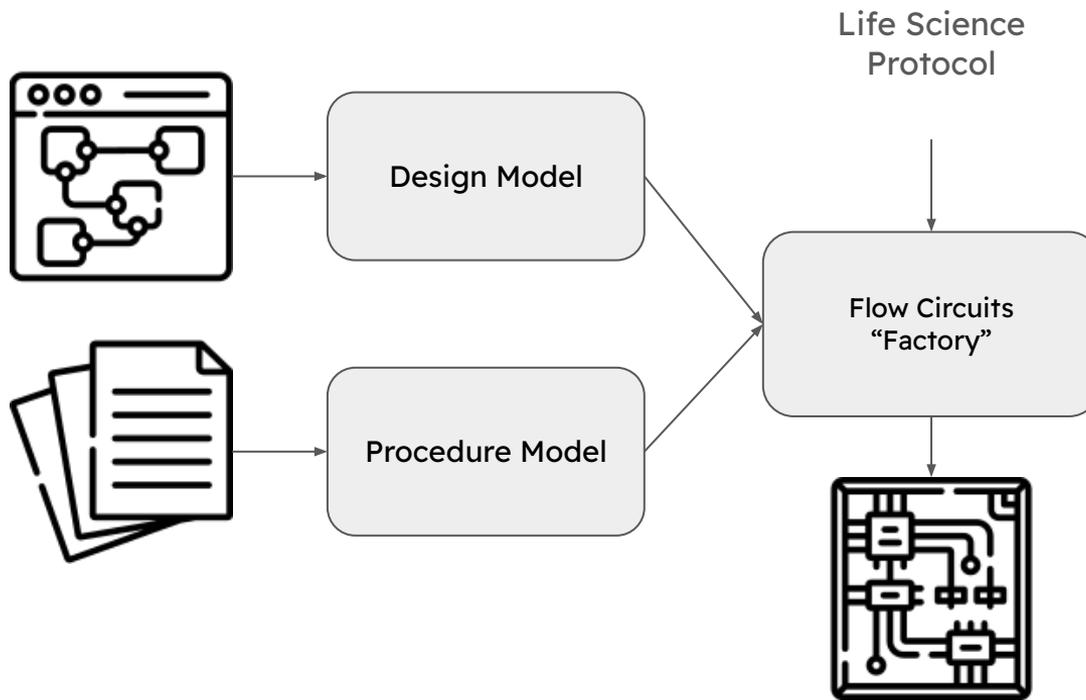
<p>PD Orgs + Mfgs</p> 	<p>CFD Software</p> 
<p>uF CAD Software</p> 	<p>Product Hacks</p> 

Product Competition Analysis



Feature	Flow Circuits	Flui'device	Flui3D	3DuF	MMFT
2D Design	✓	✓	✓	✓	●
Cloud-Based	✓	✓	✓	✓	✗
3D Design Features	✓	✓	✓	✗	✗
Snap-to-Grid	✓	✓	✓	✗	✗
Integrated manufacturing	✓	✓	●	✗	✗
Static Simulation	✓	✓	✗	✗	✗
Export to 3D CAD	✓	●	●	✗	✗
Collaboration/Sharing	✓	✗	✗	✗	✗
Dynamic Components (Pumps, Valves, etc.)	✓	✗	✗	✗	✗
Scripting	✓	✗	✗	✗	✗
Integrated OTS Components	✓	✗	✗	✗	✗
Graph Structure	✓	✗	✗	✗	✗
Revision Control	✓	✗	✗	✗	✗
PDF Drawing Export	✓	✗	✗	✗	✗
Dynamic Simulation	✓	✗	✗	✗	✗
Hardware Control	✓	✗	✗	✗	✗
Design Rule Checks	✓	✗	✓	✗	✓
Data Recording/Charting	✓	✗	✗	✗	✗
Fluid Library	✓	✗	✗	✗	✗
Multi-Layer	✓	✗	✓	✗	✗
Flow Path Visualizer	✓	✗	✗	✗	✗
Fluid Slug Analysis	✓	✗	✗	✗	✗
Multi-Architecture	✓	✗	✗	✗	✗
Multi-Unit	✓	✗	✗	✗	✗
Young-Laplace Equation	✓	✗	✗	✗	✗
Subscription/User Management	✓	✗	✗	✗	✗
Supplier Portal	✓	✗	✗	✗	✗
Auto-Routing	⚠	✗	✗	✗	✓
Ideal Gas Law	⚠	✗	✗	✗	✗

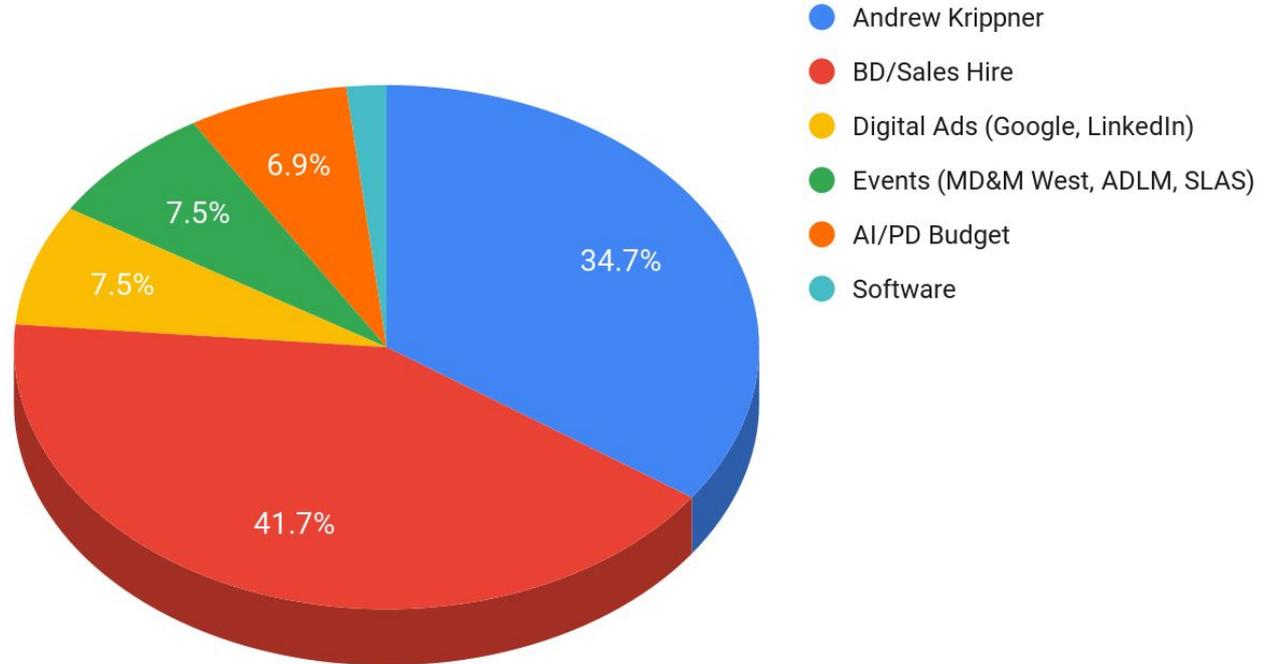
AI Strategy



Use of Funds



- Go To Market
- Key Hires (Business Development)
- 18 Months



Go To Market Phases



- Phase 1: Capture existing market (EDA for Microfluidics)
 - Target: Existing microfluidics engineers
 - GTM: Direct sales ([DTTDS](#))
 - "Our software improves the microfluidics design process, if you're designing a new product, you should use us"
- Phase 2: Provide marketplace, expand market (Microfluidics on demand)
 - Target: Scientists with processes to automate
 - GTM: Reduce CAC through PLG
 - "Microfluidics is a great way to automate, scale, and deploy the processes in your lab. You should build microfluidics, and by the way, we are the easiest way to do that."
- Phase 3: Provide scale and advanced techniques (Put all labs on chips)
 - Manufacturing
 - AI Capabilities
 - Packaged IP

Value Chain

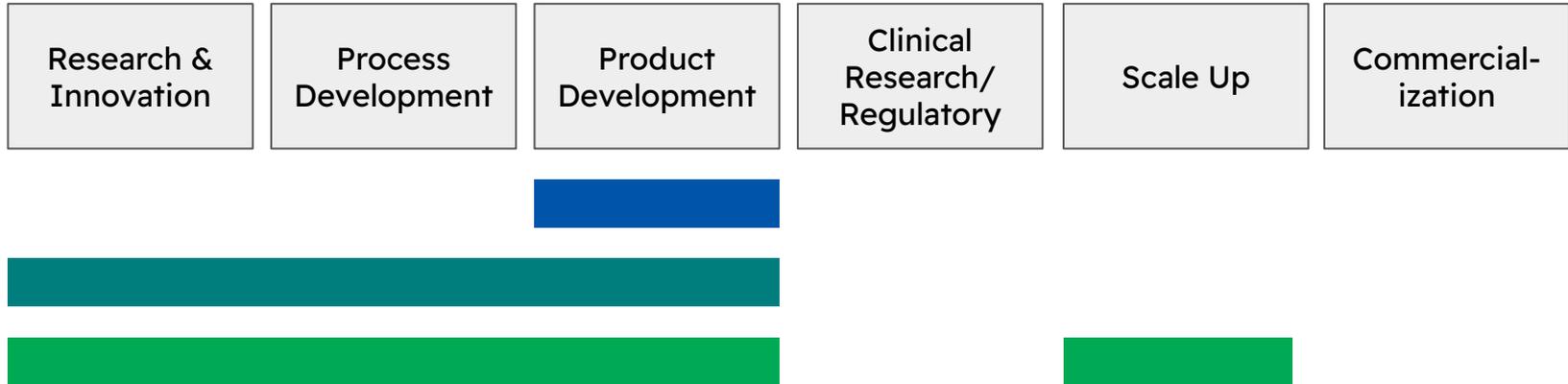
Where we fit in the life-cycle of a microfluidic life science product



Phase 1

Phase 2

Phase 3



Ideal Customer Profile



	User	Buyer
Phase 1 (Engineers)	<ul style="list-style-type: none"> → Title: Product Development Engineer, Mechanical Engineer → Company: PD Firm, Life Sci. Company, Research Lab → Current Tools: Solidworks, AutoCAD, PowerPoint → Pain: Difficult to conceptualize designs, making mistakes, takes too long → Need: A methodical way to design μF → Beliefs: “Measure twice cut once” 	<ul style="list-style-type: none"> → Title: Engineering Manager, R&D Manager, Principal Investigator → Company: PD Firm, Life Sci. Company, Research Lab → Budget: \$\$ → Pain: Going over budget, over timeline, customer angry → Need: My engineering team to make fewer mistakes and move faster → Beliefs: Time = Money
Phase 2 (Scientists)	<ul style="list-style-type: none"> → Title: Scientific Researcher → Company: Life Sci. Company, Research Lab → Current Tools: Pipettors, Liquid Handling Robots, Trad. Lab Equipment → Pain: Too much hands on time, human variables/mistakes in data, hard to scale → Need: A way to automate experiments → Beliefs: Minimize Variables 	<ul style="list-style-type: none"> → Title: CTO, VP Research, R&D Manager, Principal Investigator → Company: Life Sci. Company, Research Lab → Budget: \$\$\$ → Pain: Bad data, poor results, no products → Need: Good data → Beliefs: We need to deploy our technology to help people

Marketing Channels



- Marketplace Flywheel!
- Scientific Advisory Board
 - E.g. [Dr. Folch](#), Dr. Juncker
- Events
 - Trade Shows
 - Conferences
 - Workshops
 - Lunch and Learns
- Content (LinkedIn)
- PPC (Google Search)
- Referrals (Universities)



ADLM 2024



Business Case



Business Value Drivers

Accelerate Time-To-Market

Derisk Mission Critical Applications

Net New Revenue

Metric

Time to deliver cut by y%, resulting in x% quicker time to market

Iteration per product reduced by x%

x% increase in sales from new products (unlocked by enabling complexity)

Market Segment: Early Adopters



Attributes

Life Science Focus

Currently developing new products

Employs engineering staff

Employs R&D staff

Examples



illumina

ThermoFisher
SCIENTIFIC



GE HealthCare

Business Validation



Hypothesis	Test	
Scientists in life science companies perceive a need for a microfluidics design software to streamline laboratory processes.	Customer Interviews	✓
Life science companies are willing to pay for a microfluidics design software to automate laboratory processes.	SaaS Sales	✓
The required technology for developing the microfluidics design software is accessible and cost-effective.	Internal Expert	✓
Scientists find the user interface of the microfluidics design software easy to use and efficient.	Usability Testing	✓
Life science companies are open to adopting new technologies like microfluidics design software.	Customer Surveys	✓

Customer Validation



What specific project or challenge did you need to address with Flow Circuits?

I needed to answer fundamental “ballpark” questions around my fluid circuit. For example, “What effect will a reroute or resizing this channel have on the system timing or balance?” But investing time and money in specialized (CFD) software or consultants to run that software has delivered poor ROI in the past. So instead, I resorted to guesswork and empirical “trial and error”. **Until I found Flow Circuits.**



User had real pain!

Have you experienced cost savings, time reductions, or other measurable benefits?

Yes, not only have I saved on design time, fab and testing, but the software has allowed me to explore ideas and concepts I would not have otherwise. For example, adhesive laminates were something I used for prototyping but not scalable design. Thanks to Flow Circuits this looks to be a promising solution for both.



We provide real business value to both user and manufacturer!

How do you plan to use Flow Circuits in future projects?

I plan to develop shields for Flow Circuits control and data acquisition atop dev boards like Arduino. I'm currently building a shield to control my pumps and valves to develop and demo my projects.



They are building on top of it!

Would you recommend Flow Circuits to other companies or professionals in your industry?

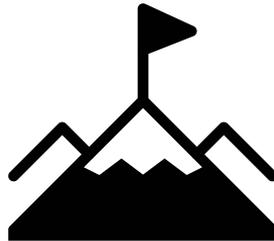
I recommend it to anyone I talk to. All professionals I know doing multidisciplinary work in R&D and elsewhere are quick to adopt development tools that extend their reach into specialty areas and accelerate their work so dramatically. There is no other way to develop complex systems on a budget. And there's always a budget.



They are recommending it to others!

Our Mission

We exist to accelerate and simplify the development of life science products to extend life and benefit human flourishing.



Our Vision

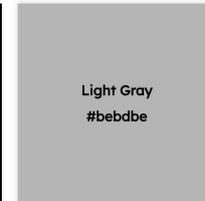
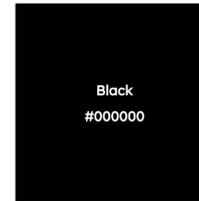
We make building Flow Circuits as easy as building printed circuit boards.



Brand



- Smart/Intellectual/Authoritative
- Approachable
- “Kleenex” Commoditization
 - “Just make a Flow Circuit”
 - “Order your Flow Circuit on flowcircuits.com”



Videos



- [Design Test Build Demo](#)
- [Promo Video](#)
- [Walkthrough Series](#)

Why Now?



Right now is the best time to make microfluidics available to the masses

- There have been significant technological advancements in microfabrication, especially in 3d printing, that enable us to build devices that were previously impossible.
- There is a macro trend toward remote healthcare and personalized medicine.
- FDA recently created the opportunity for organ-on-a-chip technologies to be used for drug testing instead of animal models.
- Just like semiconductor industry, systems are getting more complex, dense, and require more end-to-end integration.

Capital Efficiency

We can build this business for cheap!

- Our marketplace suppliers promote us for free!
- We've acquired customers through no-cost product-led growth
- Our tech stack is designed to be simple, easy to maintain, and easy to hire for (Typescript)
- AI has made development cheaper and faster
- We don't need more money to achieve software milestones



Air Logic
312 followers
6d · 🌐

Make sure to stop by and check us out in person at #MITM24 organized by [Advanced Regenerative Manufacturing Institute \(ARMI\)](#) | [BioFabUSA](#) May 21-23!

[#biomedical](#) [#biofabrication](#) [#medicaldevice](#) [#lifescience](#) [#industrial](#) [#engineering](#)



John Hayden · 1st
Director of Air Logic
6d · 🌐

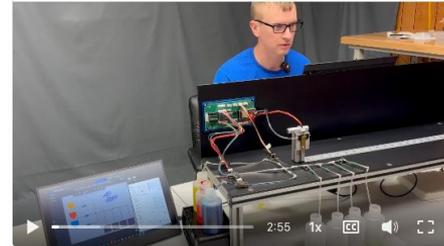
Testing out our new exhibit table setup for next week at #MITM24 ! It is a collaboration between [Air Logic](#) , [Bartels Mikrotechnik](#) and [Flow Circuits](#)

I wanted a demo circuit that would show the simulation vs real world performance. Looks pretty close to me!

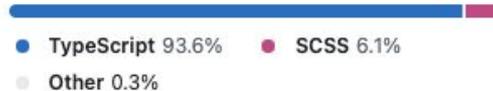
Next week, we will be showcasing how Air Logic components can be used in the [#biofabrication](#) industry.

Flow circuits is a design and simulation software for fluidic systems. Look for the Air Logic components that are directly integrated in the software!

Special thanks to Bartels for supplying the micro pumps, controller and controller software.



Languages



Potential Acquirers



Biotechnology/Pharmaceutical	<ul style="list-style-type: none">• Johnson & Johnson• Roche• Pfizer	Significant enhancement in drug discovery, diagnostics, and personalized medicine through lab-on-a-chip applications and high-throughput screening.
Medical Device	<ul style="list-style-type: none">• Medtronic• Becton Dickinson (BD)• Boston Scientific	Innovation in medical diagnostics and treatment devices, including point-of-care testing and implantable devices.
Engineering/Industrial	<ul style="list-style-type: none">• Siemens• Honeywell• Schneider Electric	Process automation and control with application benefits.
Manufacturing	<ul style="list-style-type: none">• Vantiva• Sony• HP Inc.	Provides applications for their advanced manufacturing technologies in microfluidic systems, creating new market opportunities and enhancing product offerings.
Chemical/Materials	<ul style="list-style-type: none">• BASF• Dow Inc.• 3M	Provides applications for their materials in microfluidic systems, enabling new market opportunities.
Technology/Software	<ul style="list-style-type: none">• Microsoft• Google• IBM	Health tech, and wearable device innovations; intersection of software and hardware for health monitoring and data analytics; data center applications.

The More You Know



\$1500

Average cost of
blood test



>\$1B

Cost to develop
single drug



30-50%

Biologist's time
manually moving
fluids with pipette

Biotech has failed to progress at the pace of
computing: (Moore's Law vs [Eroom's Law](#))