



# Can microfluidics be truly user-friendly?

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MFMET - Workshop on Standardization of Test Methods in Microfluidics  
May 2024 - Lisbon



Microfluidics  
Innovation  
Center

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# What does plug and play mean to you?

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If you ask an Engineer...



PHOTOGRAPH BY DOMINIC LIPINSKI, PA IMAGES VIA GETTY IMAGES

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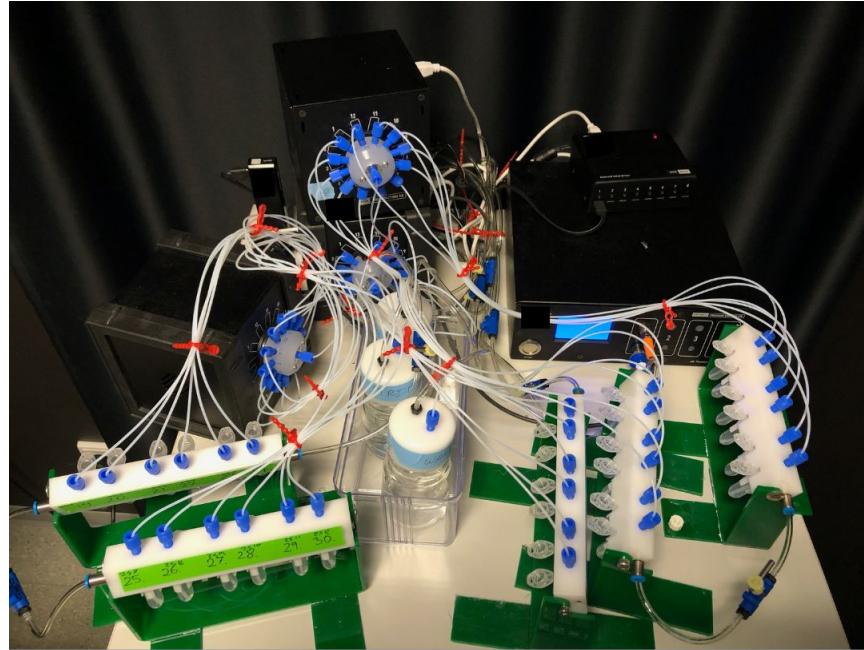
If you ask a biologist...



# As microfluidics evolved from MEMS...

A thick yellow horizontal bar is positioned below the title. In the top right corner, there is a large, abstract yellow shape composed of several overlapping circles and organic forms.

# As microfluidics evolved from MEMS...

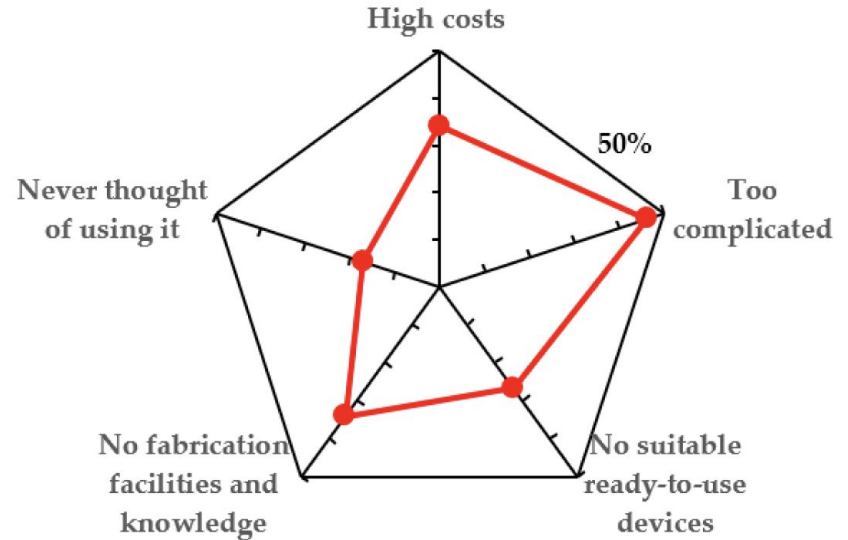


... so did the engineering approach.

# These different world views can pose real problems

- Independent study: 187 researchers from 35 countries; ~49% have not used OoC yet
- Main reasons for lack of adoption:
  - Too complicated
  - No facilities and knowledge to implement it
  - High costs

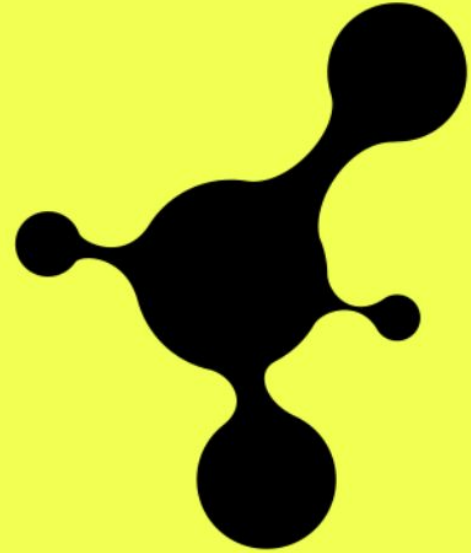
Figure 3. Obstacles for OoC usage from researchers not using OoC technology yet (group B).



Source: Busek, M.; Aizenshtadt, A.; Amirolo-Martinez, M.; Delon, L.; Krauss, S. Academic User View: Organ-on-a-Chip Technology. *Biosensors* **2022**, *12*, 126. <https://doi.org/10.3390/bios12020126>

So, can  
microfluidics be  
truly  
user-friendly?

Spoiler alert: We believe it can ;)





# But who are we?



Microfluidics  
Innovation  
Center

- 50+ granted European Projects
- 10% success rate in submissions
- 20+ researchers and engineers
- 10+ new products under development
- 4 spin-offs



# Collaboration + Research = Innovation

Focus on microfluidic instrumentation for flow sensing and control

Proof-of-Concepts

Instrumentation

Software and  
Integration

European Funding

Technology  
valorization

Tech Transfer

# Collaborative Development

All this is possible because we have awesome partners in European funded projects



Funded by  
the European Union

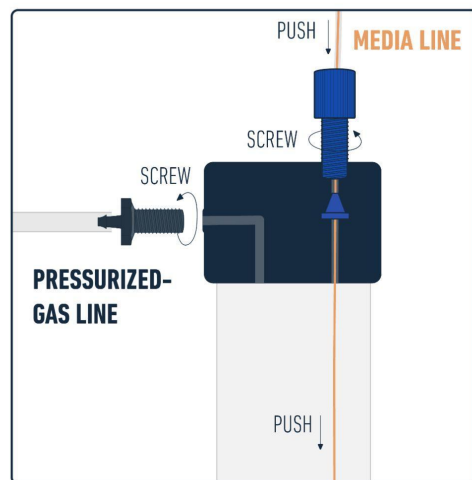
And many more!

# The devil is in the details

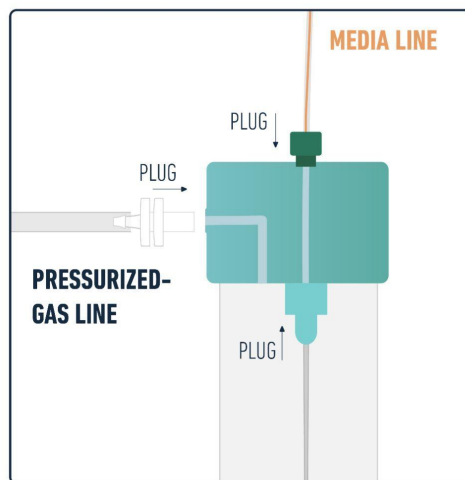


Grant Agreement No. 101037090

Before



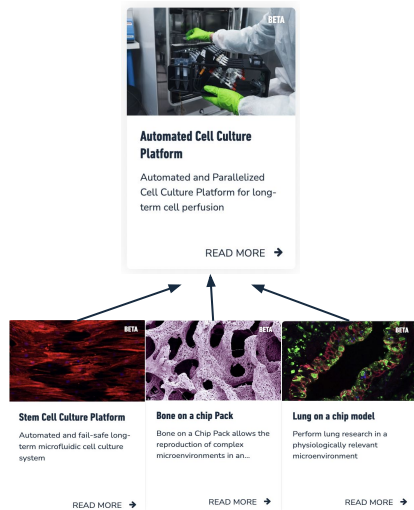
After



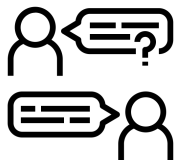
# How do we know what to target first?

## Our strategy at a glance

Put a web page online supported by application pages



Perform interviews with potential users that contact us through the pages

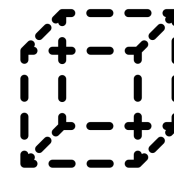


Send prototypes or MVPs (minimum viable products) to be beta tested in real settings

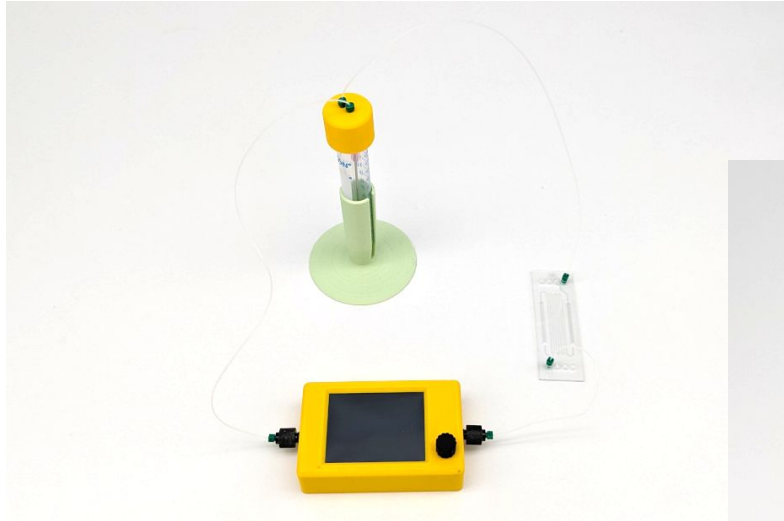


Iterate!

Beta product gets upgraded to product!



# Size does matter



In this case, the smaller the better!

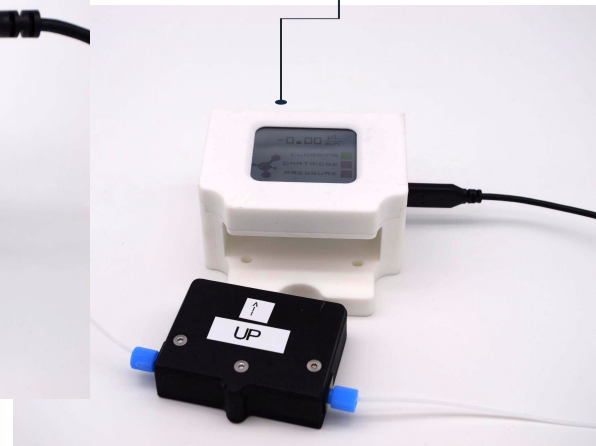


# Widening flow rates possibilities without losing precision

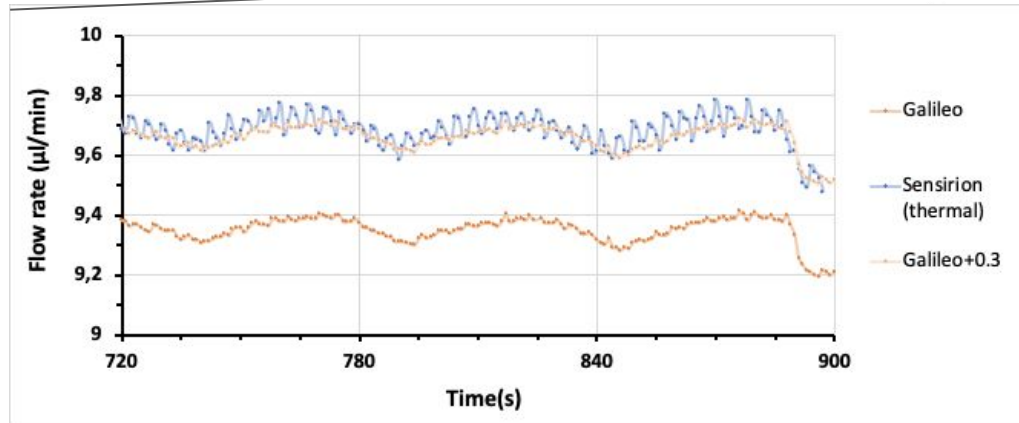
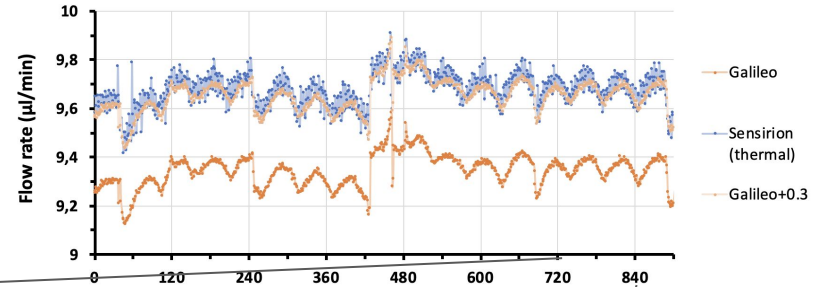
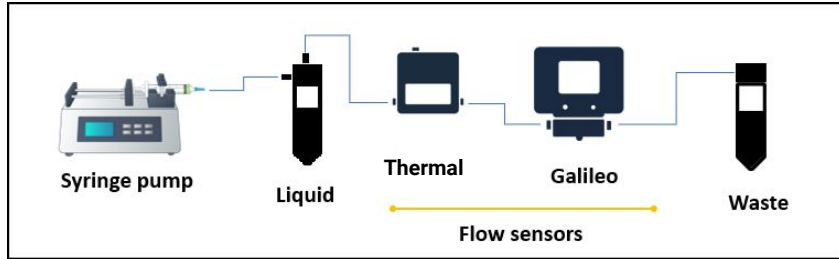
Built in clogging detection



Disposable cartridge for sterility

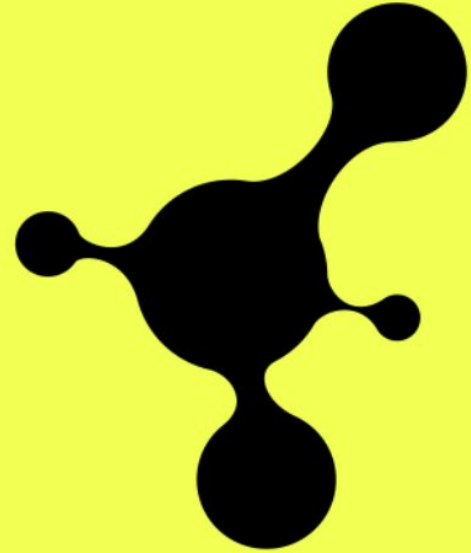


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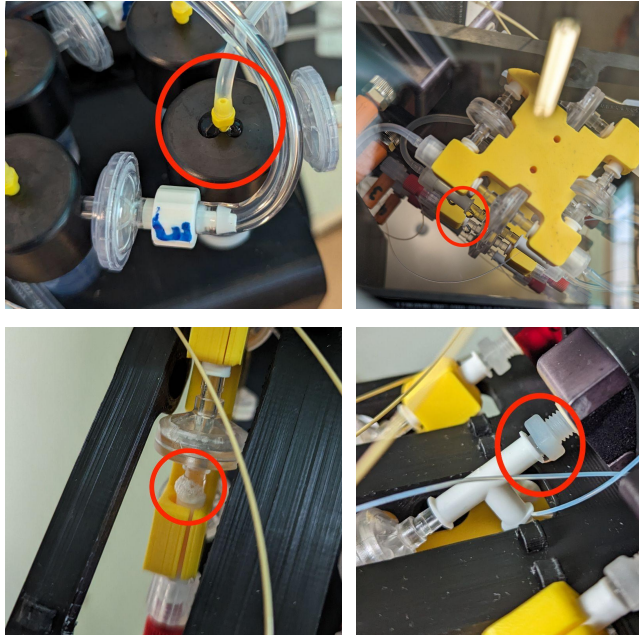




But, finally, can  
microfluidics be  
truly  
user-friendly?



# There's nothing like seeing the magic in action



Visit to a collaborator to assess the usability of a microfluidic platform:

- Issues with clogging leading to leakage
- High complexity of interconnections leads to leakage and difficulty to keep sterility
  - Strong need for simplification and for better interconnection adapters

# A compromise between flexibility and usability

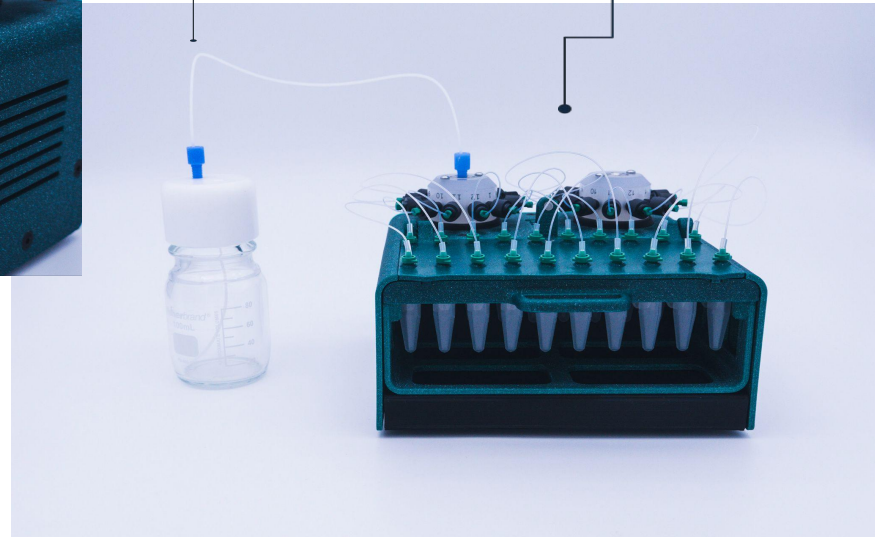


Automated

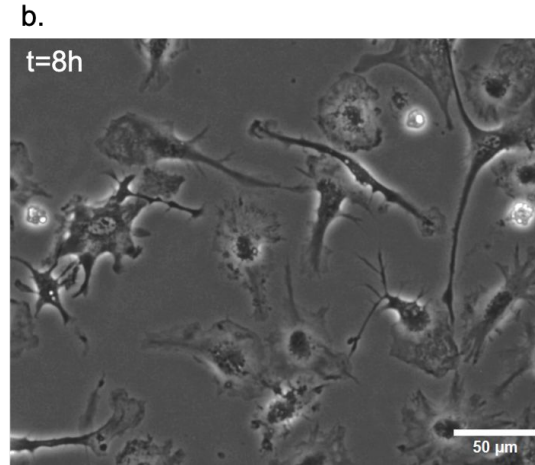
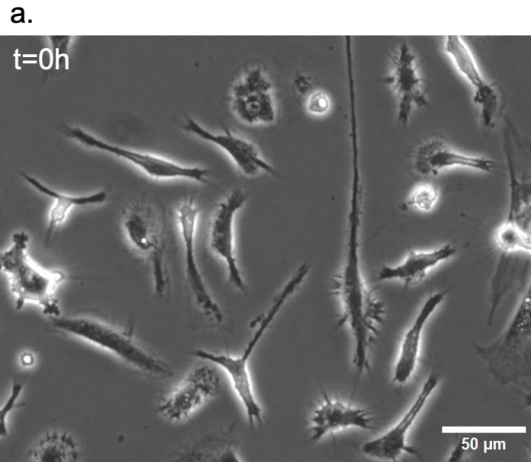
Adapted to  
Eppendorfs or  
well-plates

Compatible with  
different volumes

Up to 20 different  
samples

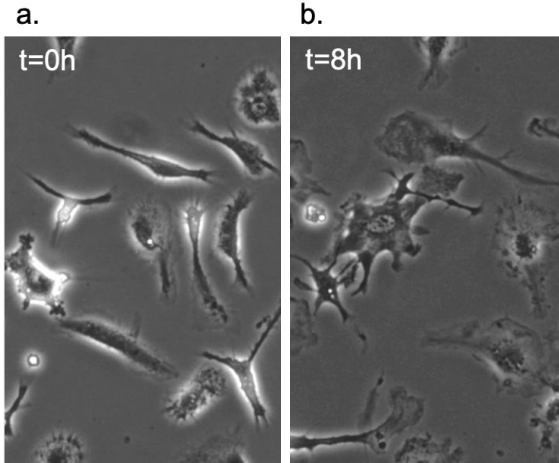


# And, of course, we get our hands wet as well

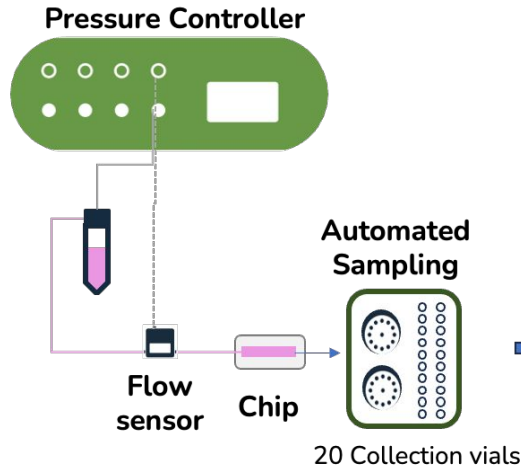


Primary microglial cells from mouse pups

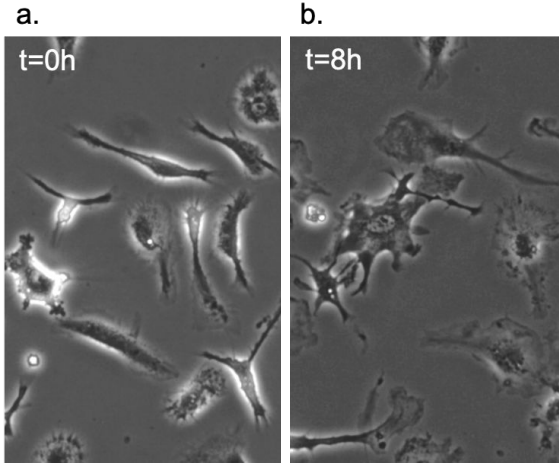
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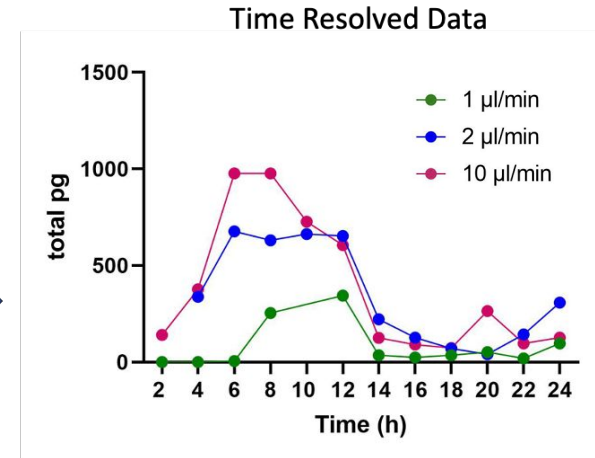
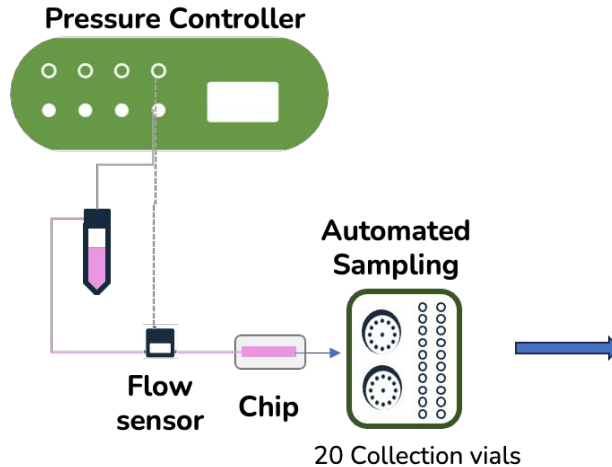
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Thank you!

Questions?

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