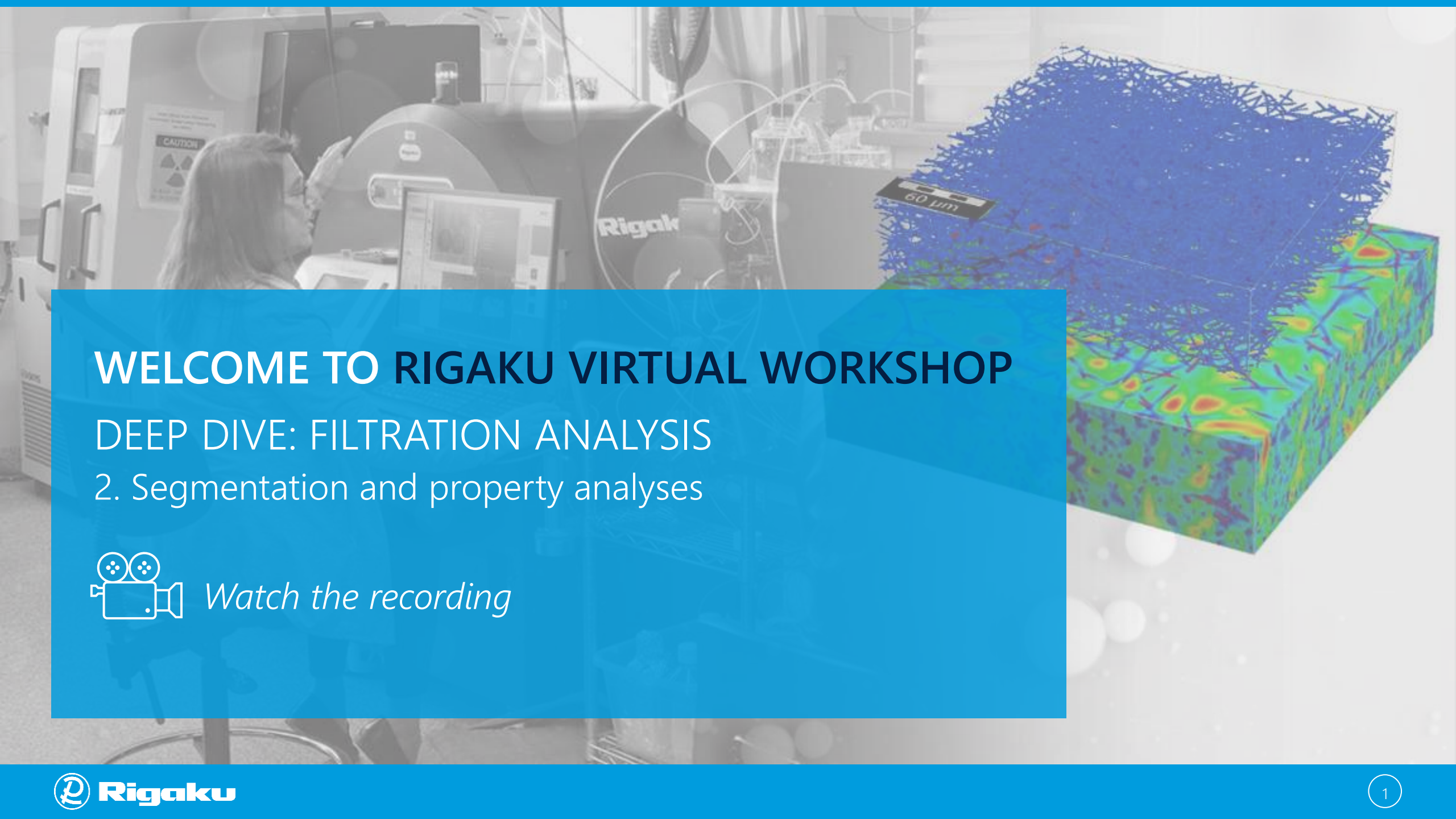


WELCOME TO RIGAKU VIRTUAL WORKSHOP

DEEP DIVE: FILTRATION ANALYSIS

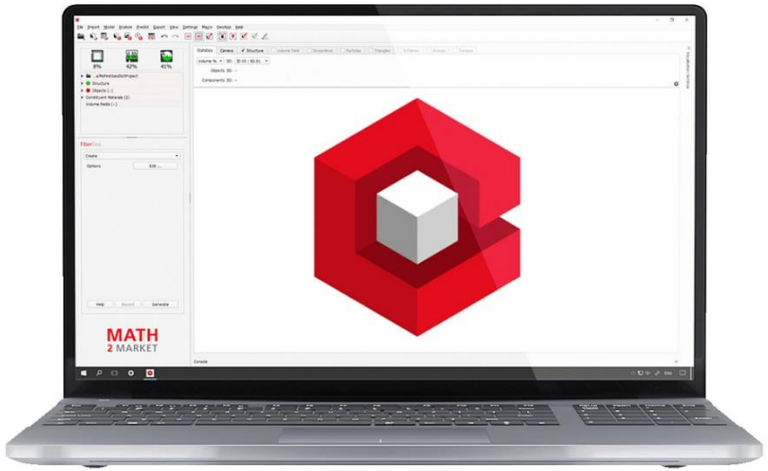
2. Segmentation and property analyses

Watch the recording

Presenter: **Angela Criswell** | Senior Scientist

Co-presenter: **Aya Takase** | Director of X-ray Imaging

Host: **Tom Concolino** | Analytical X-Ray Consultant



GeoDict

The Digital Material Laboratory

Philipp Eichheimer, Ph.D. | Math2Market

Application Engineer

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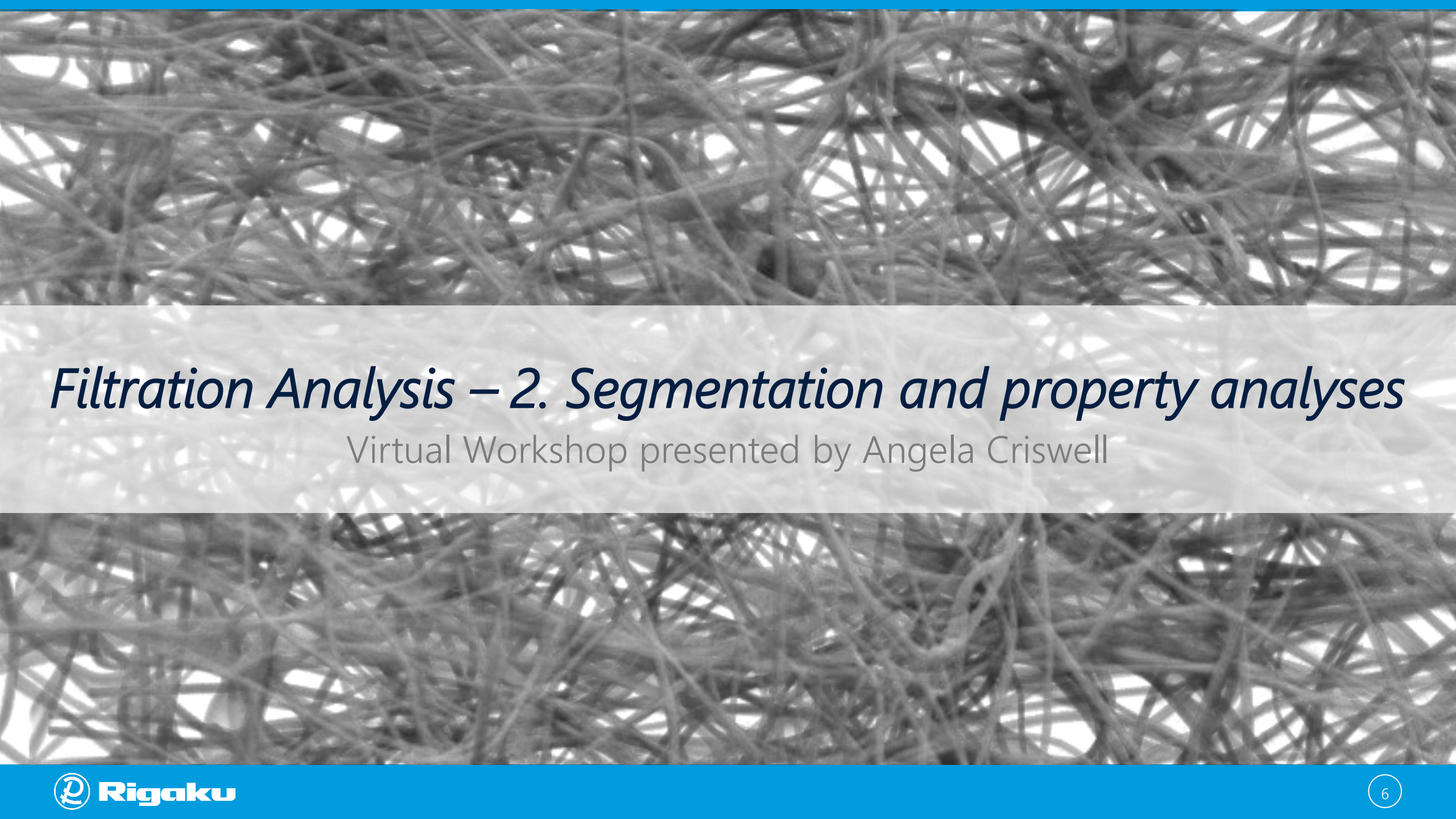
You can ask questions during the presentation.
We might turn on your microphone for further discussions.

Recording will be available tomorrow.



Filtration Analysis – 2. Segmentation and property analyses

Virtual Workshop presented by Angela Criswell

FILTRATION ANALYSIS SERIES

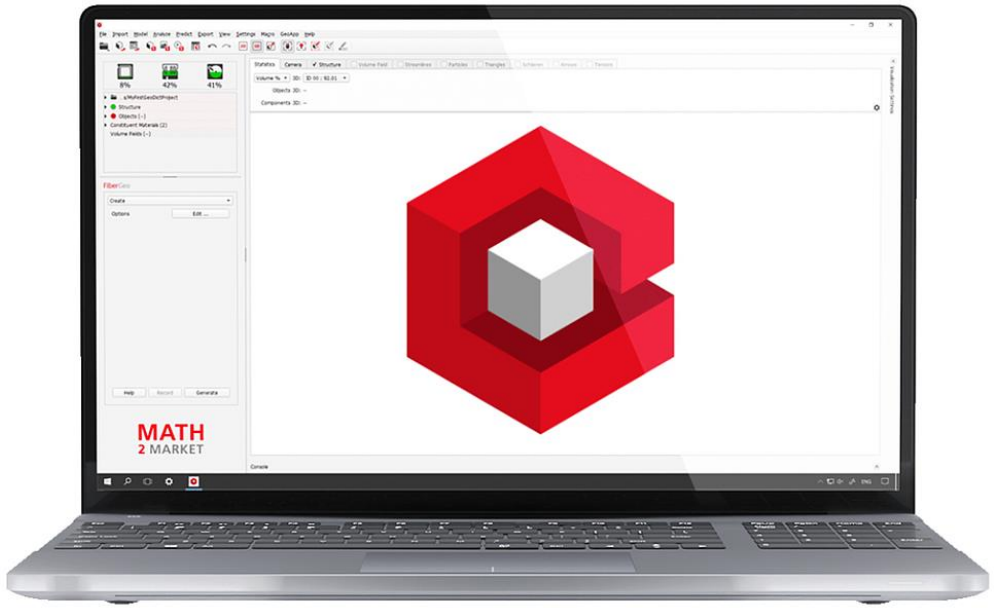
1. Data collection
2. Segmentation and property analyses
3. Filtration simulations

THINGS WE'LL COVER

- How to identify and segment fibers
- How to analyze fiber media properties
- How to model fiber media

nano3DX by Rigaku

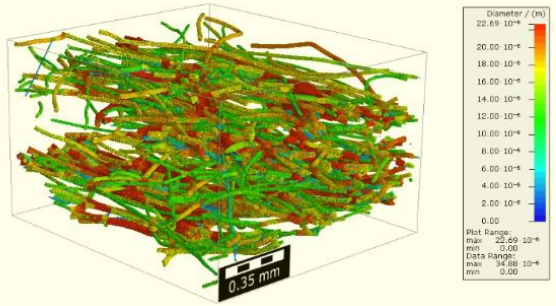
High resolution and high contrast for soft materials



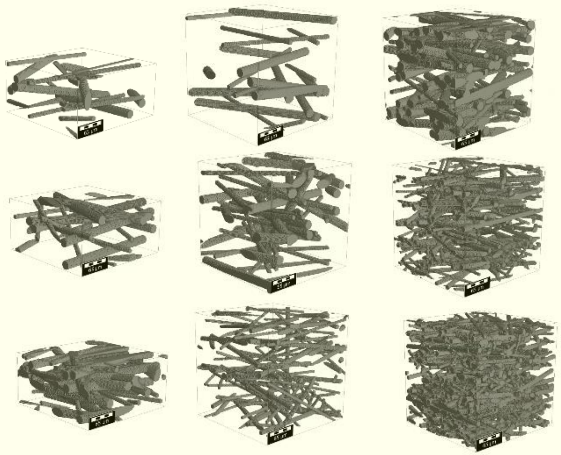
GeoDict by Math2Market

The Digital Material Laboratory

CT data



Filter media analysis



Filter media modeling

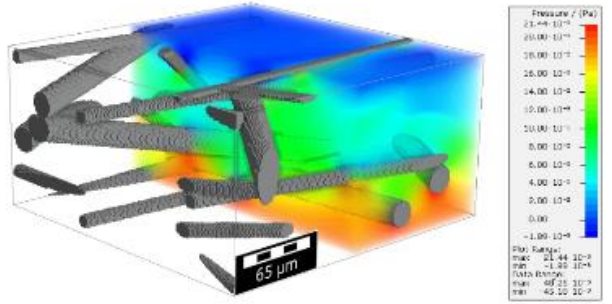
Filter optimization

http://www.tsi.com

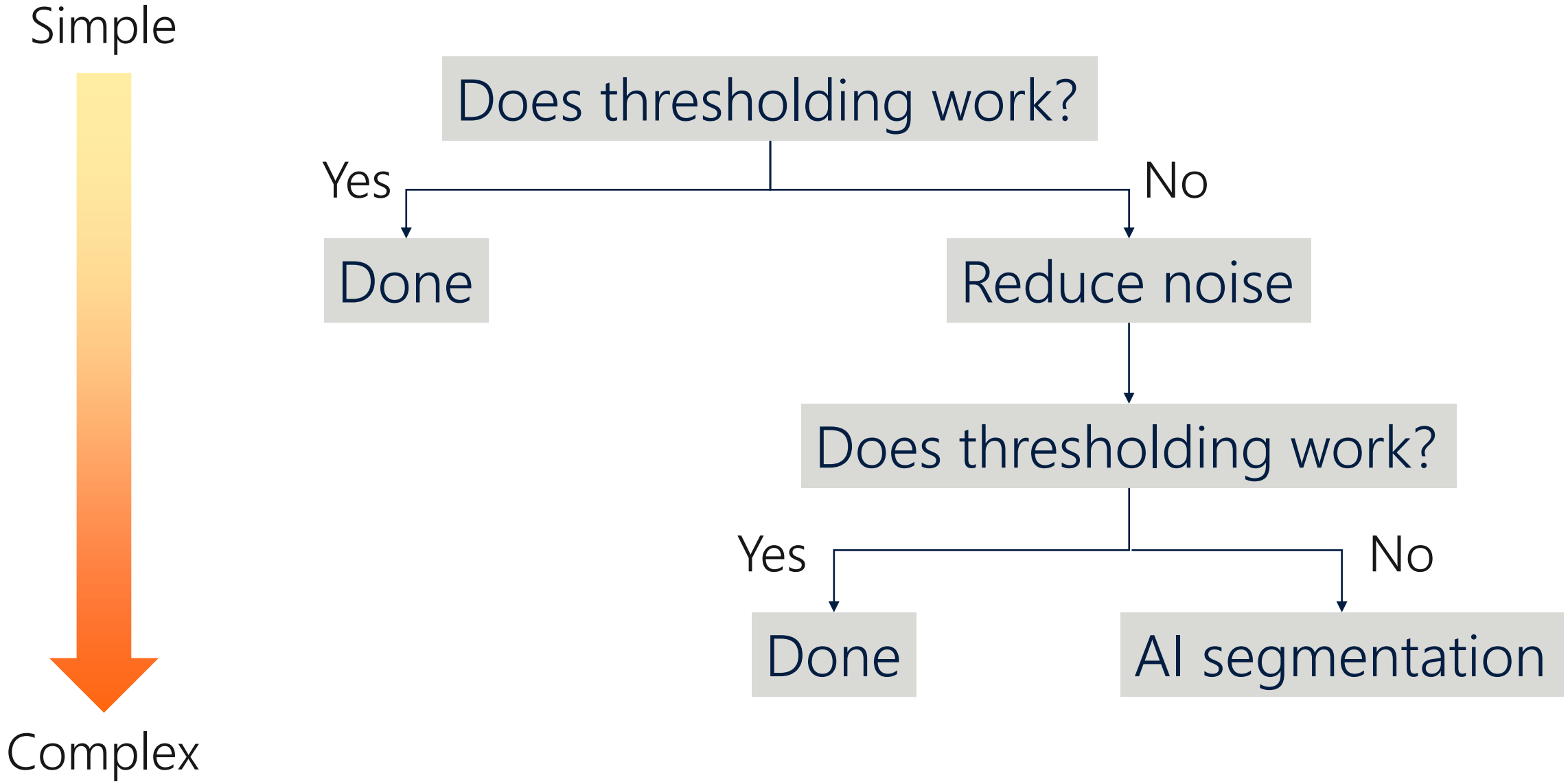
Testing

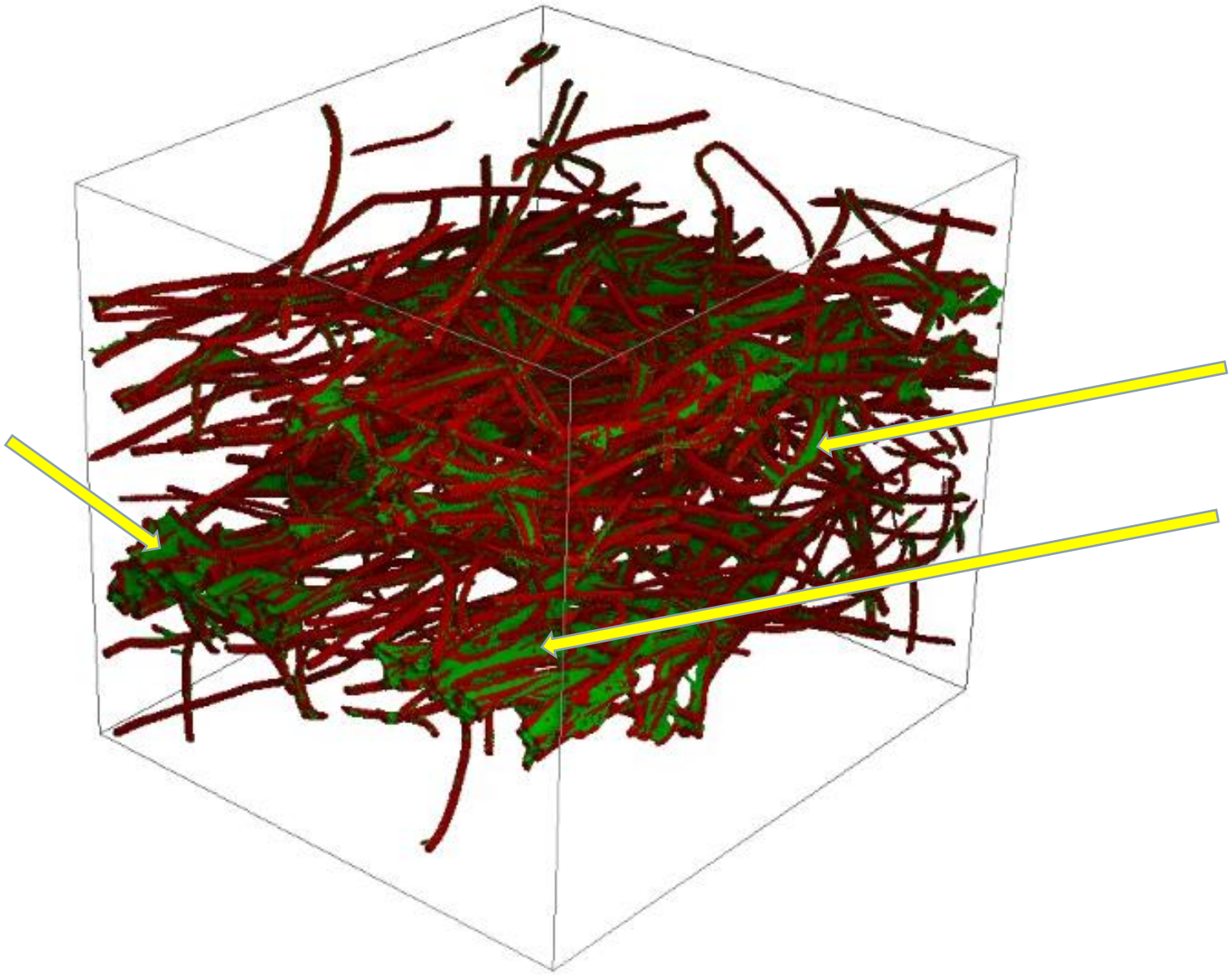
http://www.airfilterusa.com , http://www.zoro.com

Manufacturing

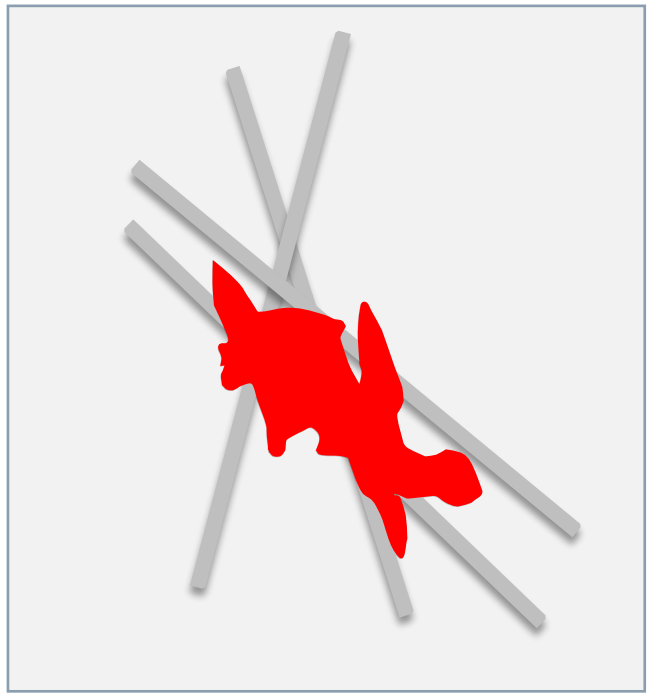


Filtration simulations

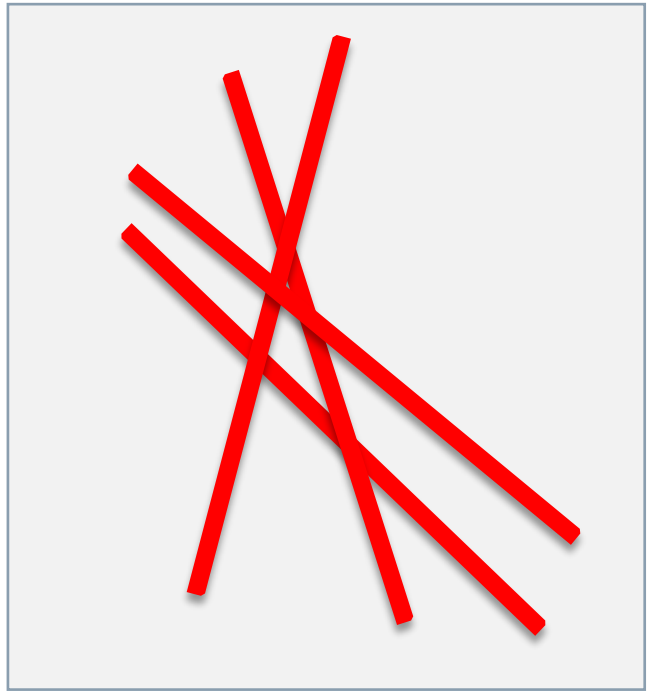

Simple
Complex
Does thresholding work?
Yes
No
Done
Reduce noise
Does thresholding work?
Yes
No
Done
AI segmentation



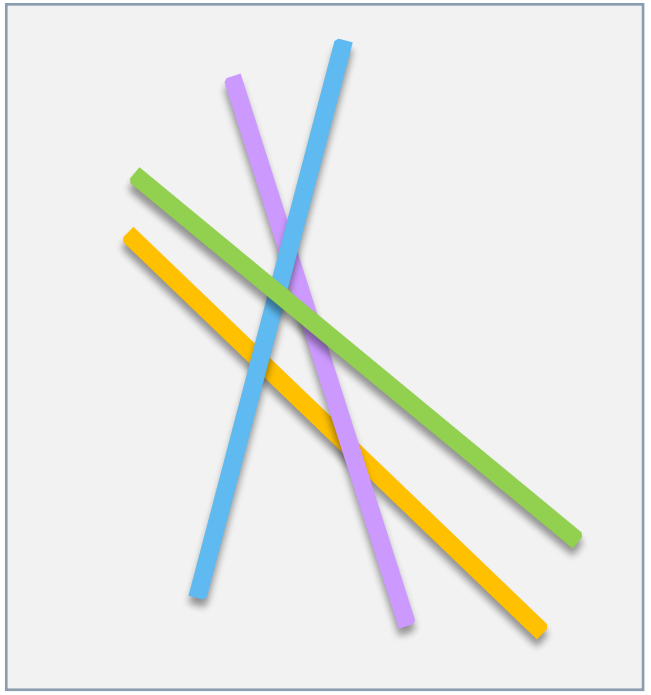
Binder Find



Fiber Find



Analyze individual fibers

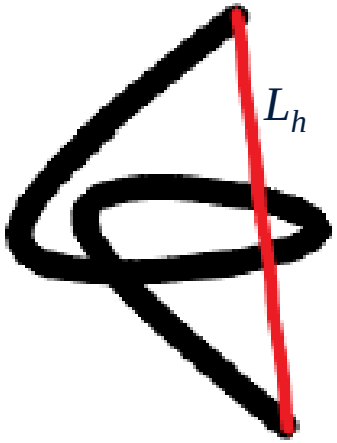


ANALYZING FIBER MEDIA PROPERTIES

- Porosity / grammage (fiber + binder)
- Fiber length and diameter
- Fiber curliness and curvature
- Fiber orientation

CURLINESS

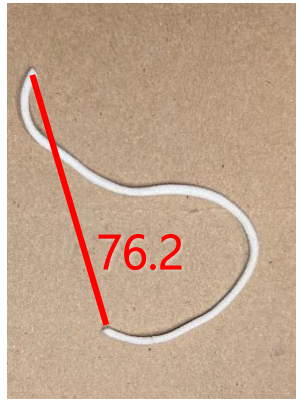
- fiber length (L_{fiber}) – 380 mm



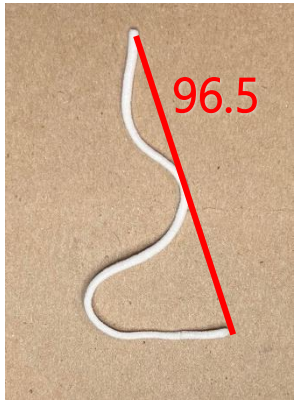
$$curliness = \frac{L_{fiber}}{L_h}$$

8.92

3.32

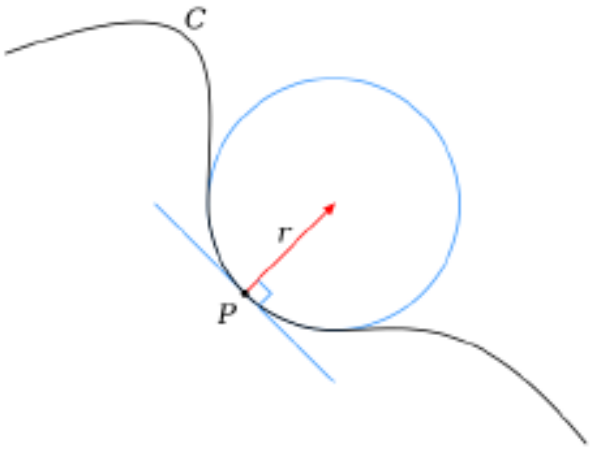


4.99



3.94

CURVATURE

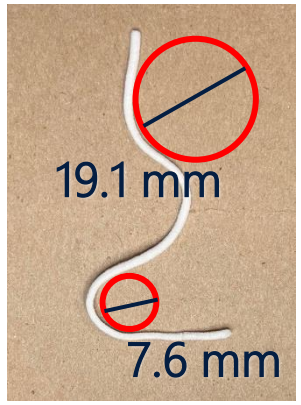


$$curvature = \frac{1}{r}\ (\mathrm{m}^{-1})$$

8.7e+4

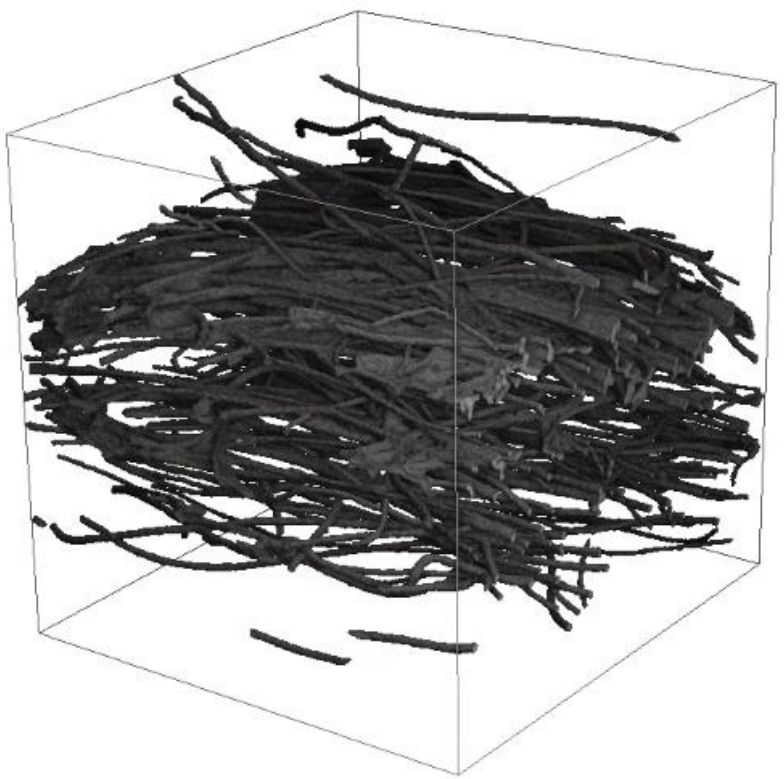
8.3e+4

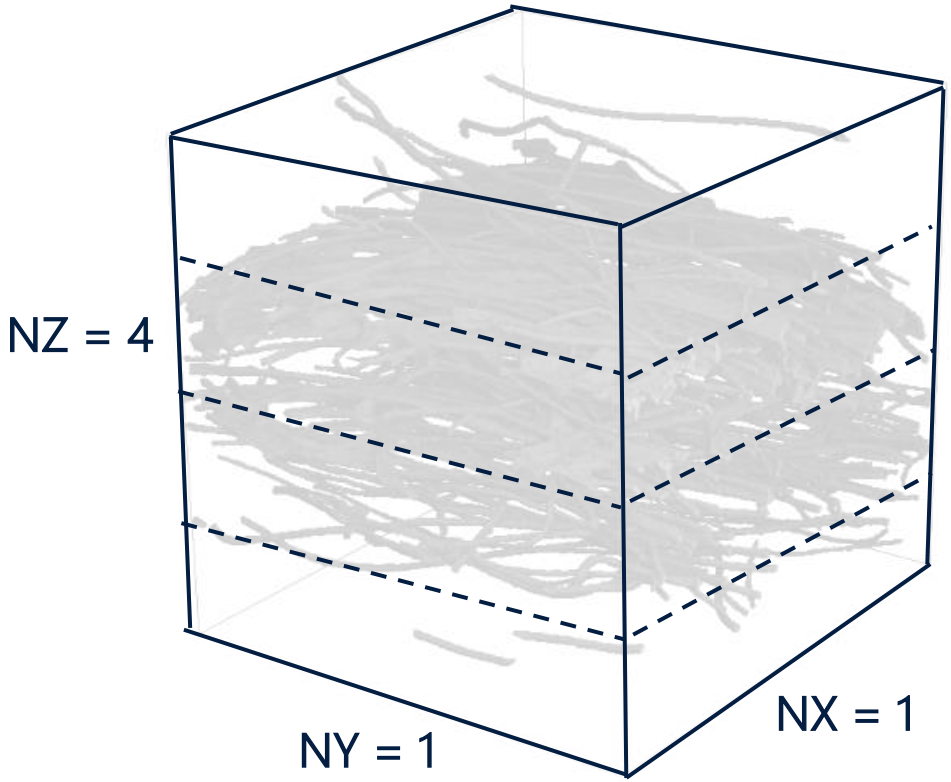
6.1e+4



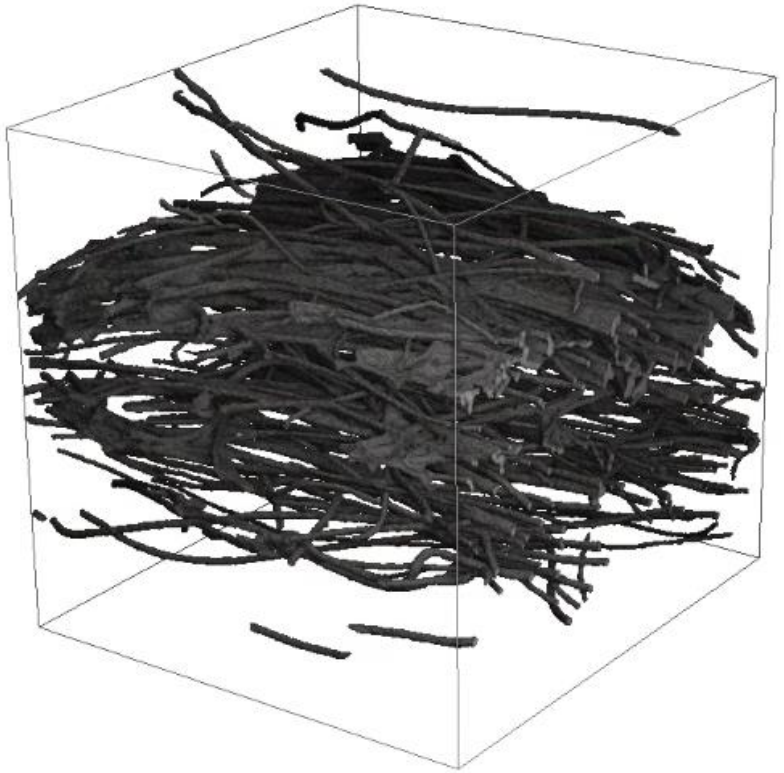
5.2e+4
13.2e+4

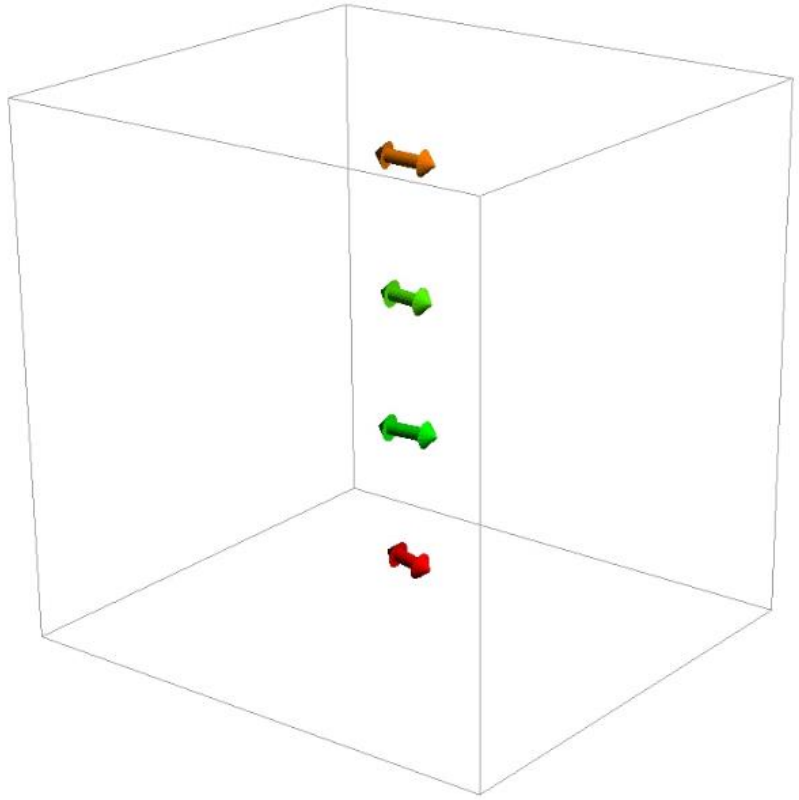
COMPUTING FIBER ORIENTATIONS





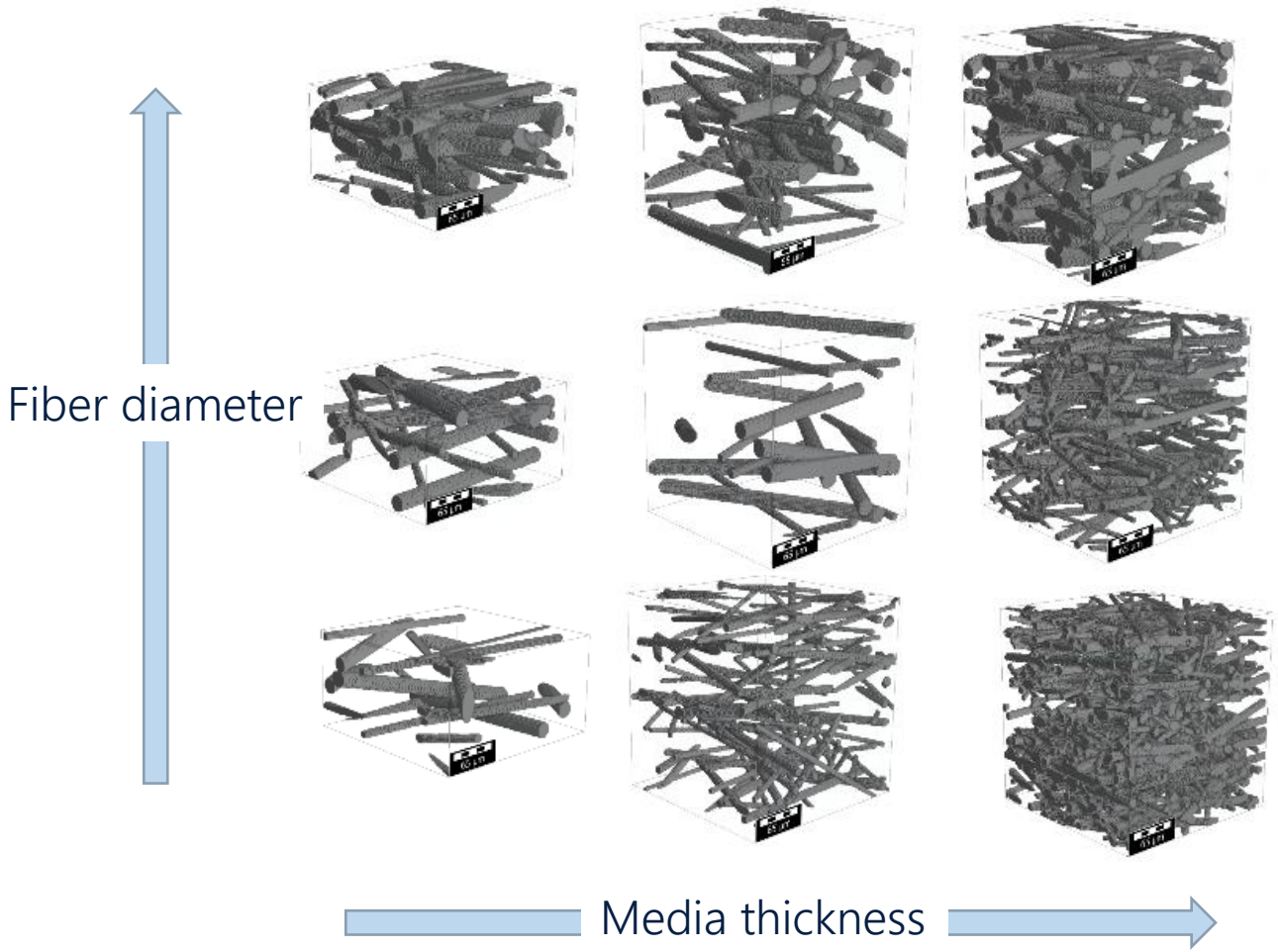
COMPUTING FIBER ORIENTATIONS





WHY DO WE CHARACTERIZE FIBER MEDIA?

FILTER MEDIA MODELING



- Fiber diameter
- Fiber length
- Fiber shape
- Fiber orientation
- Fiber layering
- Fiber overlap
- Binder volume

THINGS WE COVERED

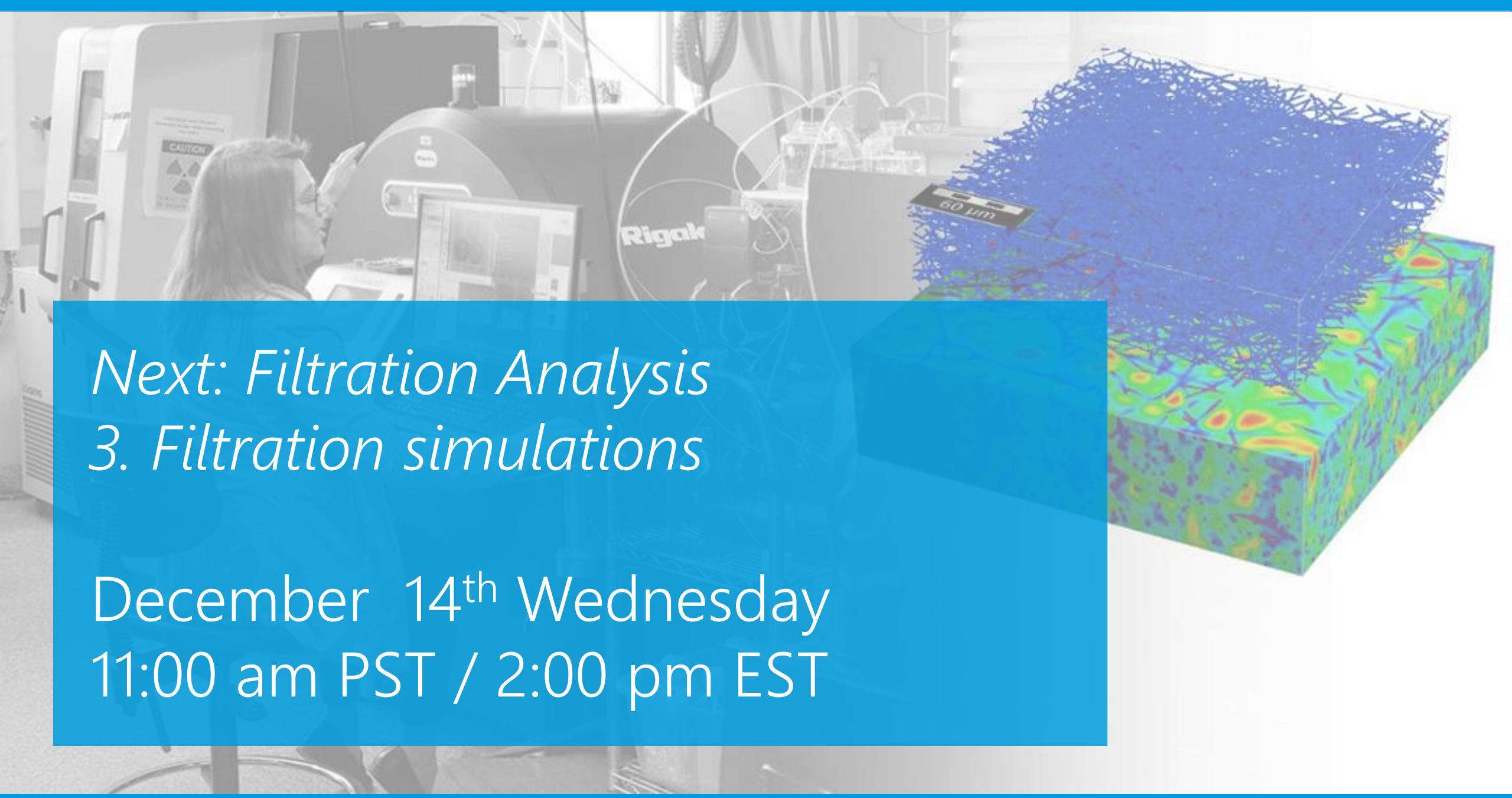
- How to identify and segment fibers
- How to analyze fiber properties, including fiber diameter, orientation and curvature
- How to model fiber media

Q & A SESSION

We'll follow up with your questions.

Recording will be available tomorrow.

Register for the next workshop.



Next: Filtration Analysis
3. Filtration simulations

December 14th Wednesday
11:00 am PST / 2:00 pm EST

THANK YOU FOR JOINING US
SEE YOU NEXT TIME