

Synchrotron- μ CT-scans

allow an unprecedented insight
into insect morphology and
evolution

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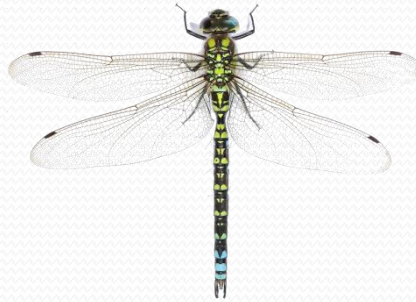
Previous research with SR- μ CT

- First organisms that took it to the sky:

Silverfish



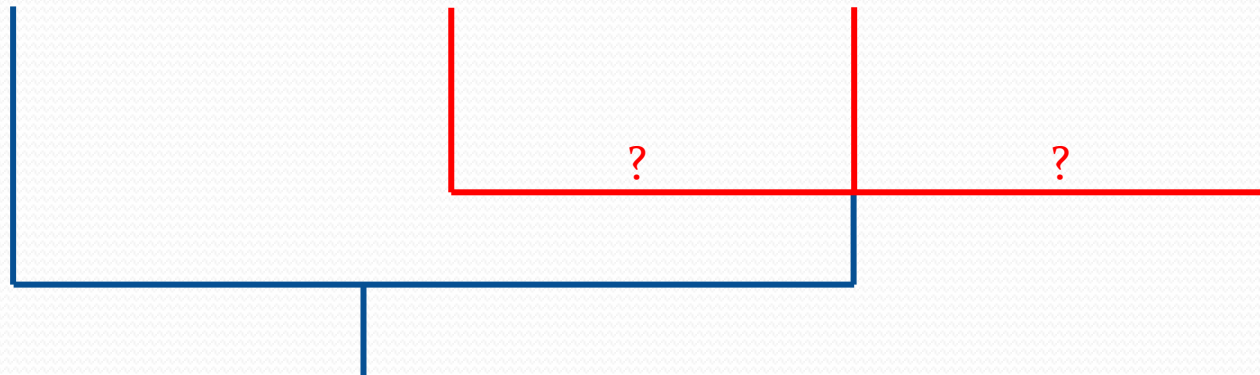
Dragonflies



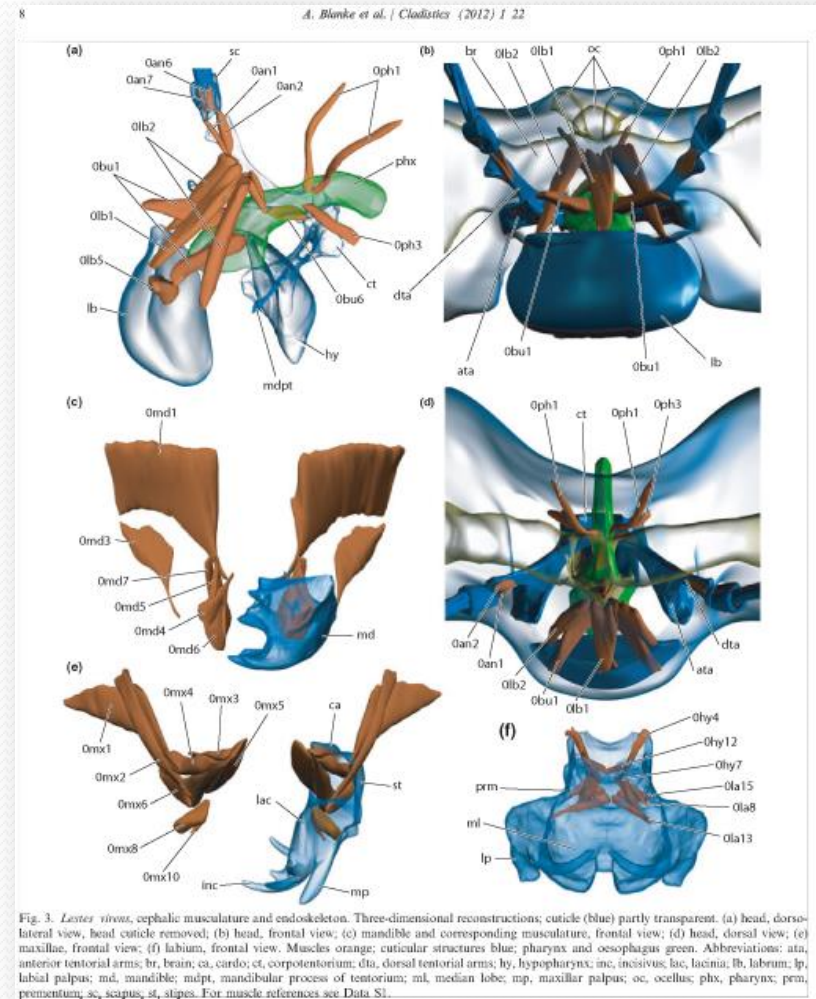
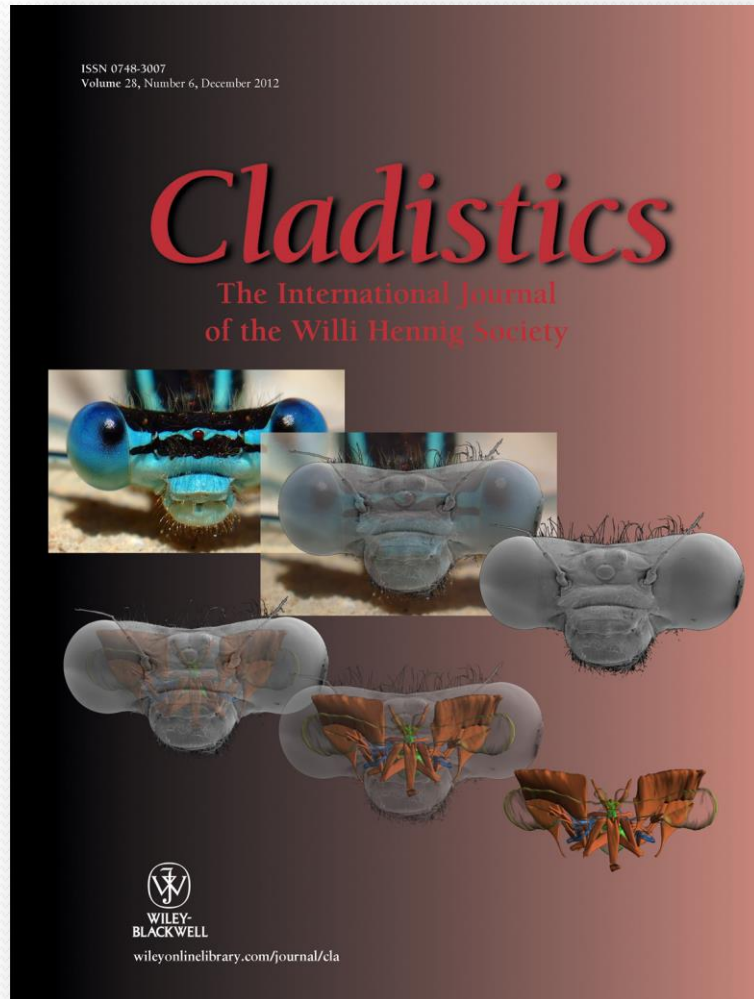
Mayflies



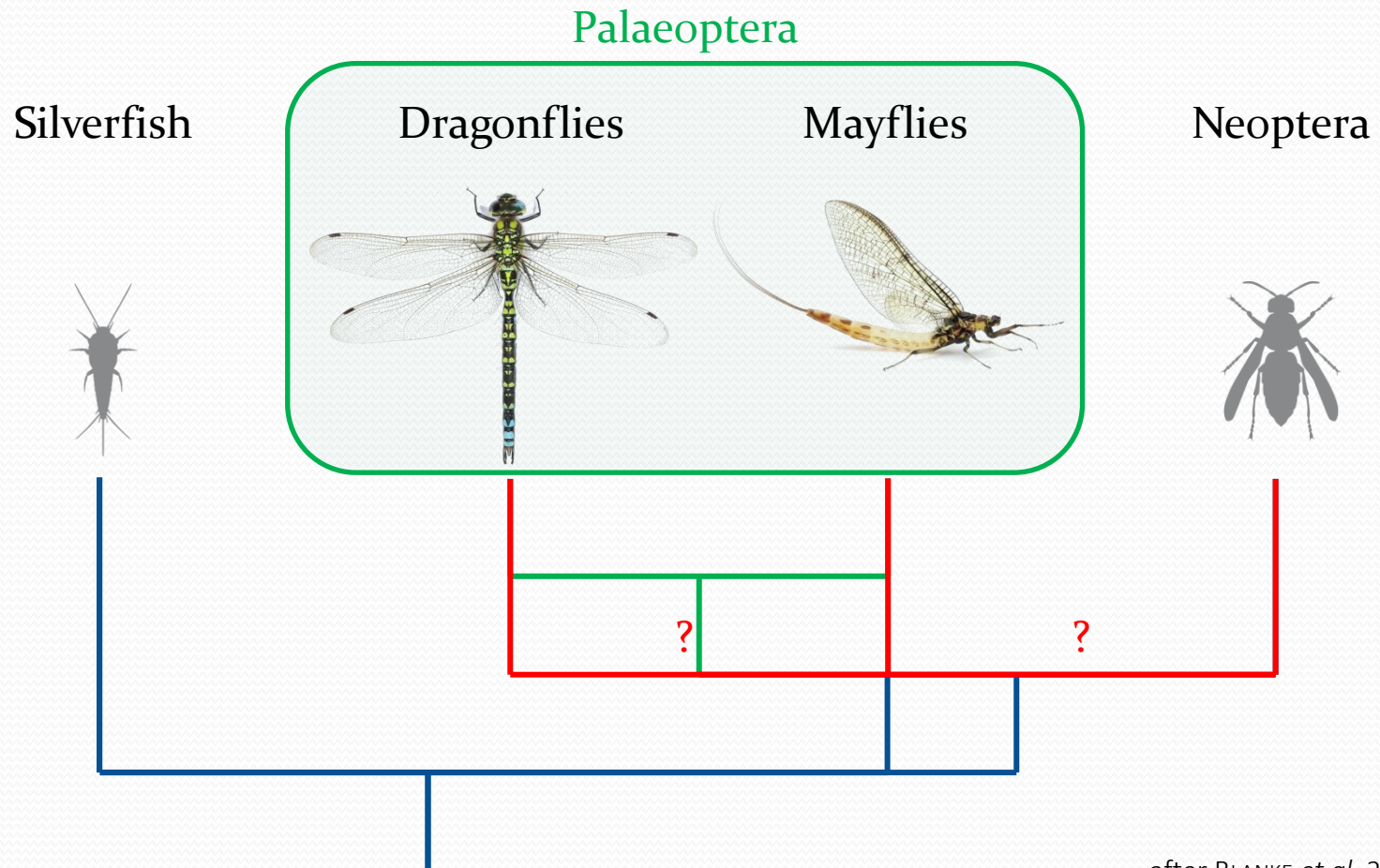
Neoptera



Previous research with SR- μ CT



Previous research with SR- μ CT



Current research



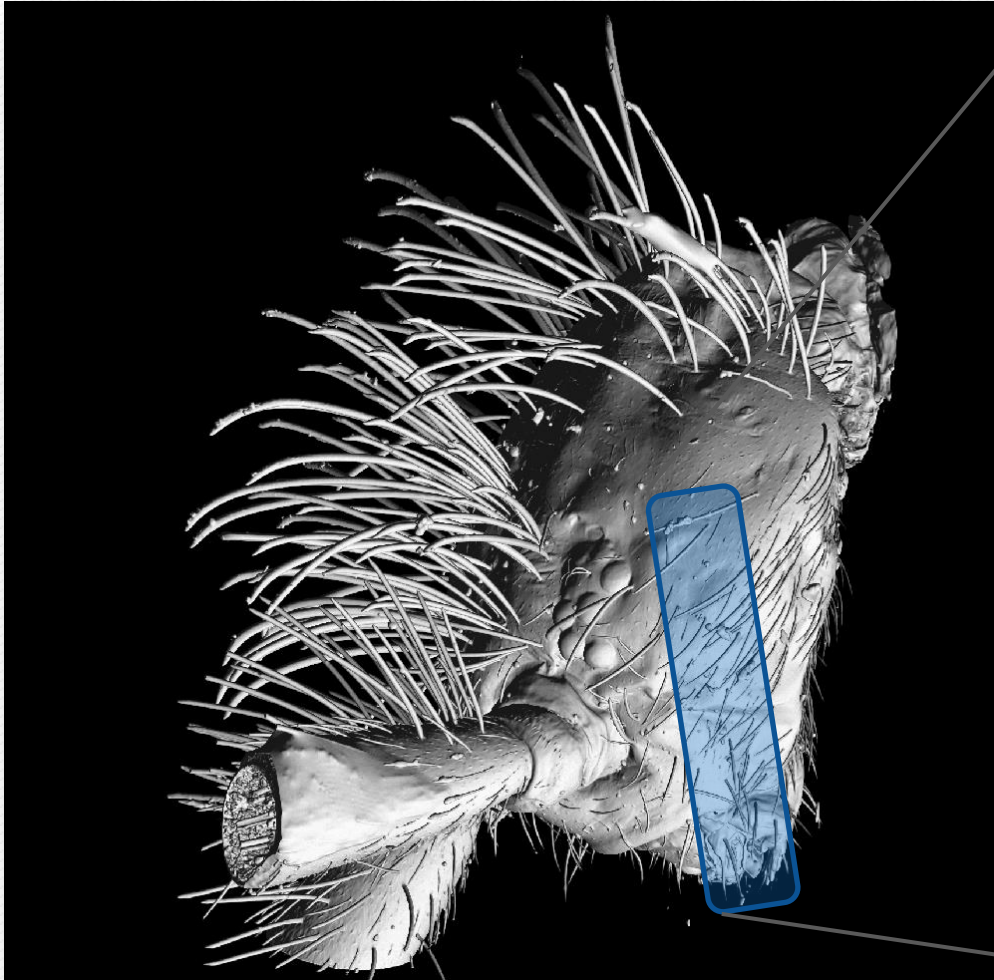
a springtail, ~ 7 mm body length



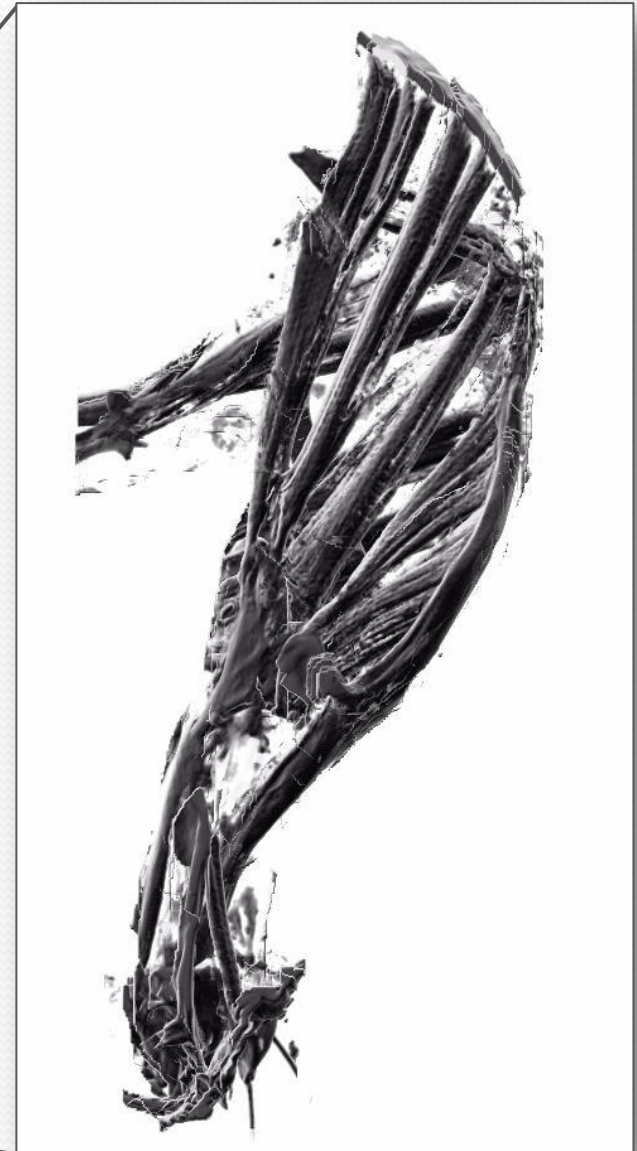
SR-μCT of a springtail head

~ 1 mm

Current research

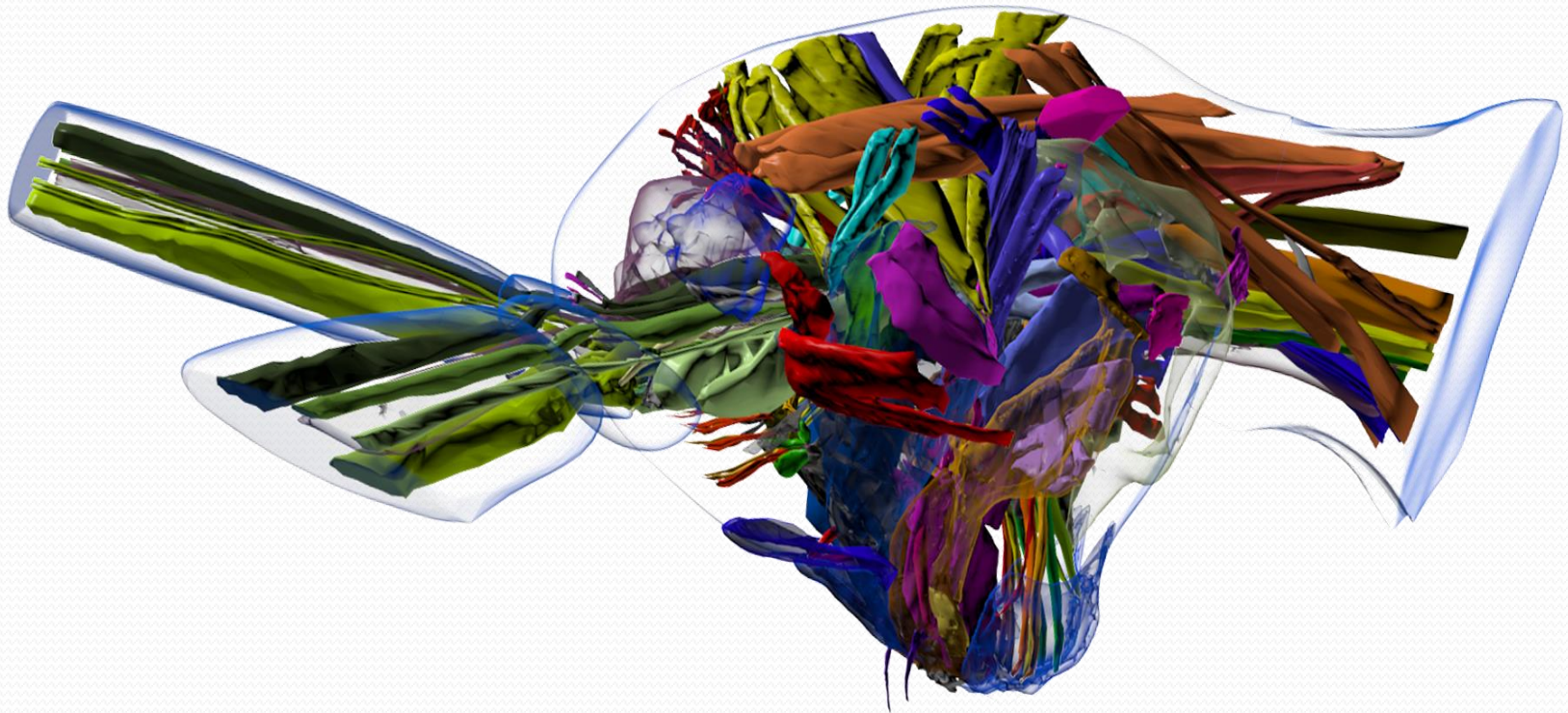


Volume render of a springtail head
~ 1 mm



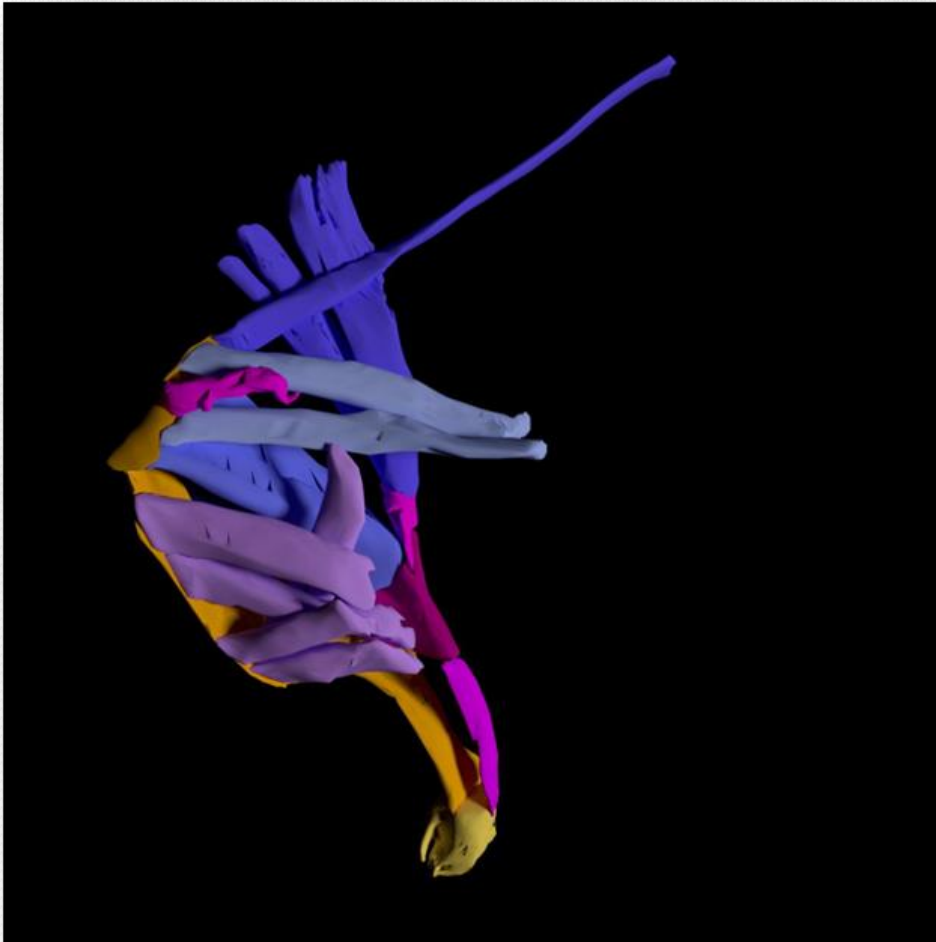
Volume render of a mouthpart
~ 600 μm

Current research

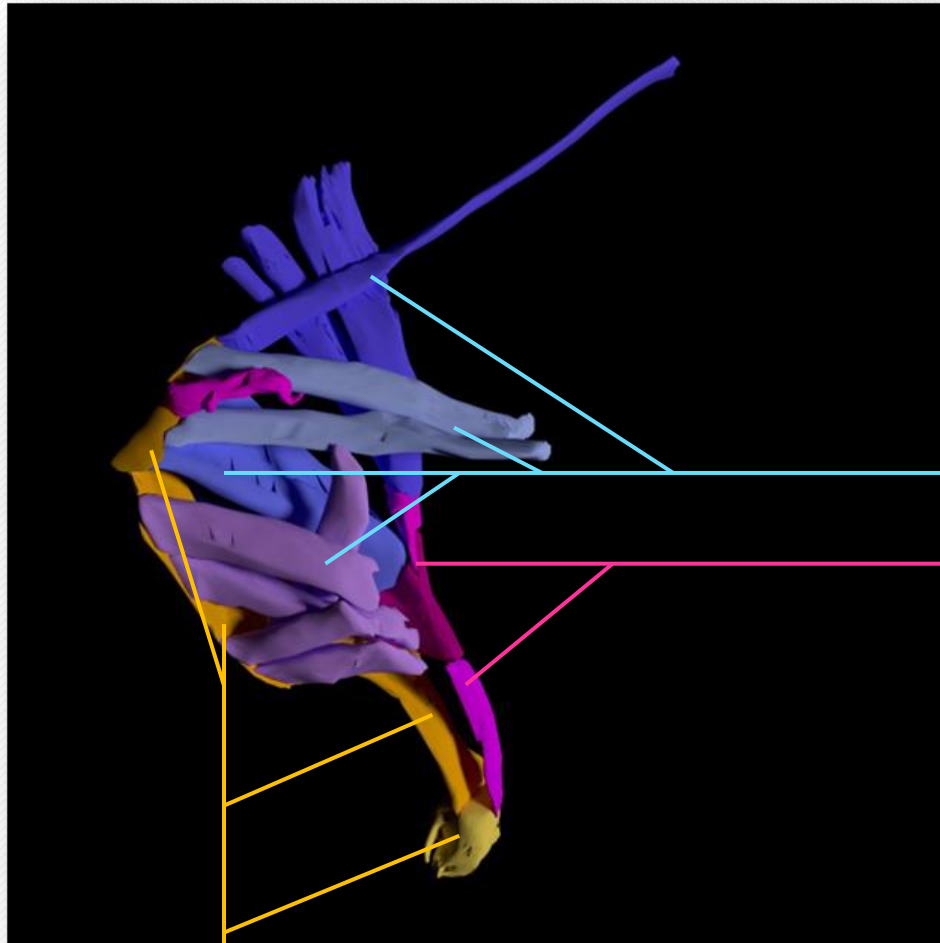


3D-reconstruction of a springtail head
~ 1 mm

Current research



Current research

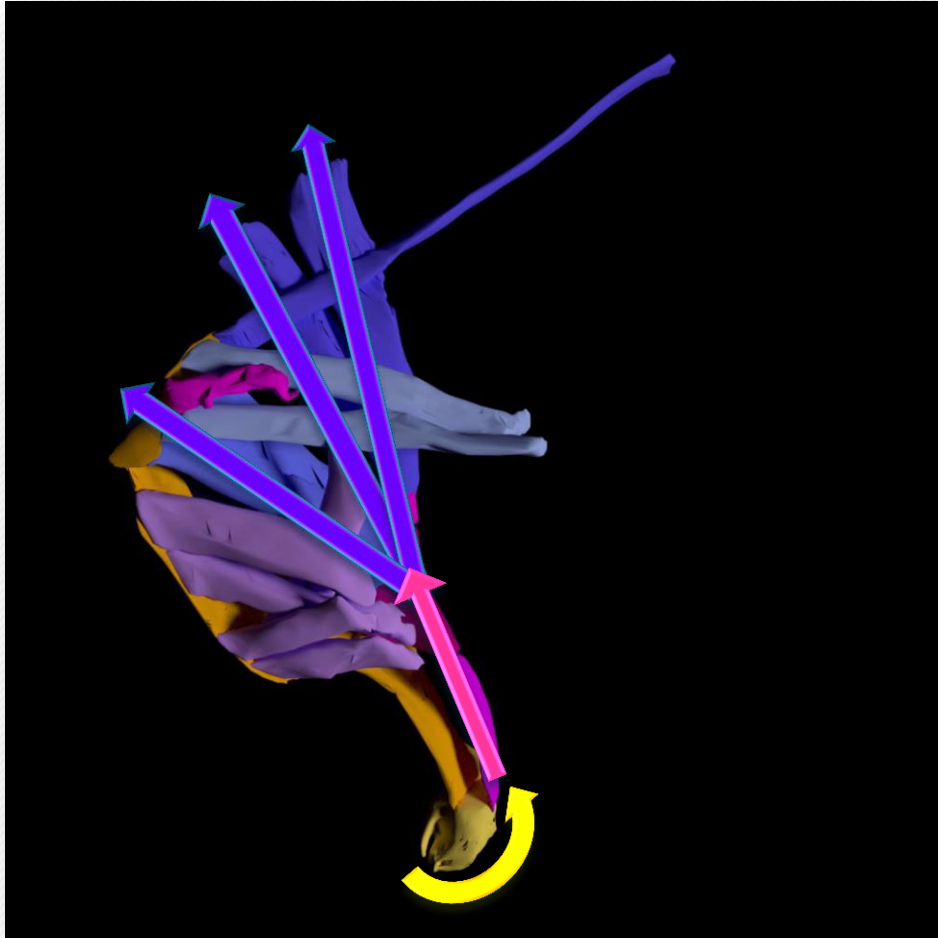


muscles

stiff connection (chitin)

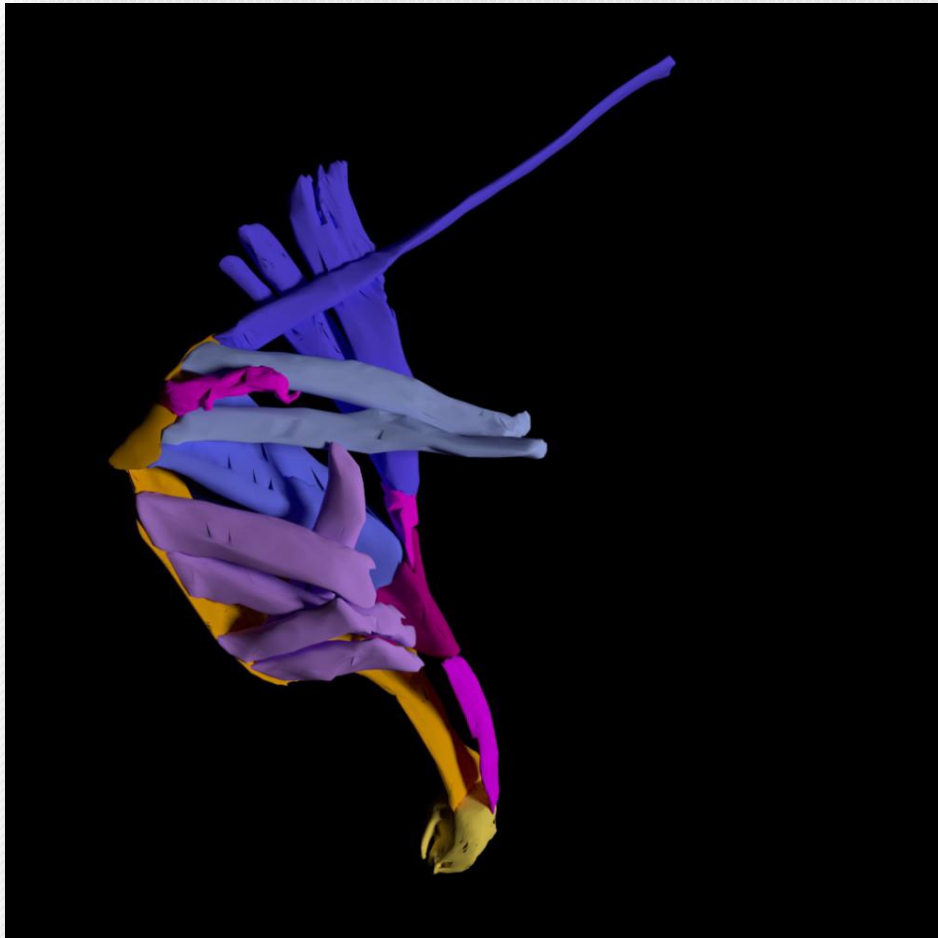
mouthpart (maxilla)

Current research



Left mouthpart of a springtail
~ 0.6 mm

Current research



Left mouthpart of a springtail
~ 0.6 mm



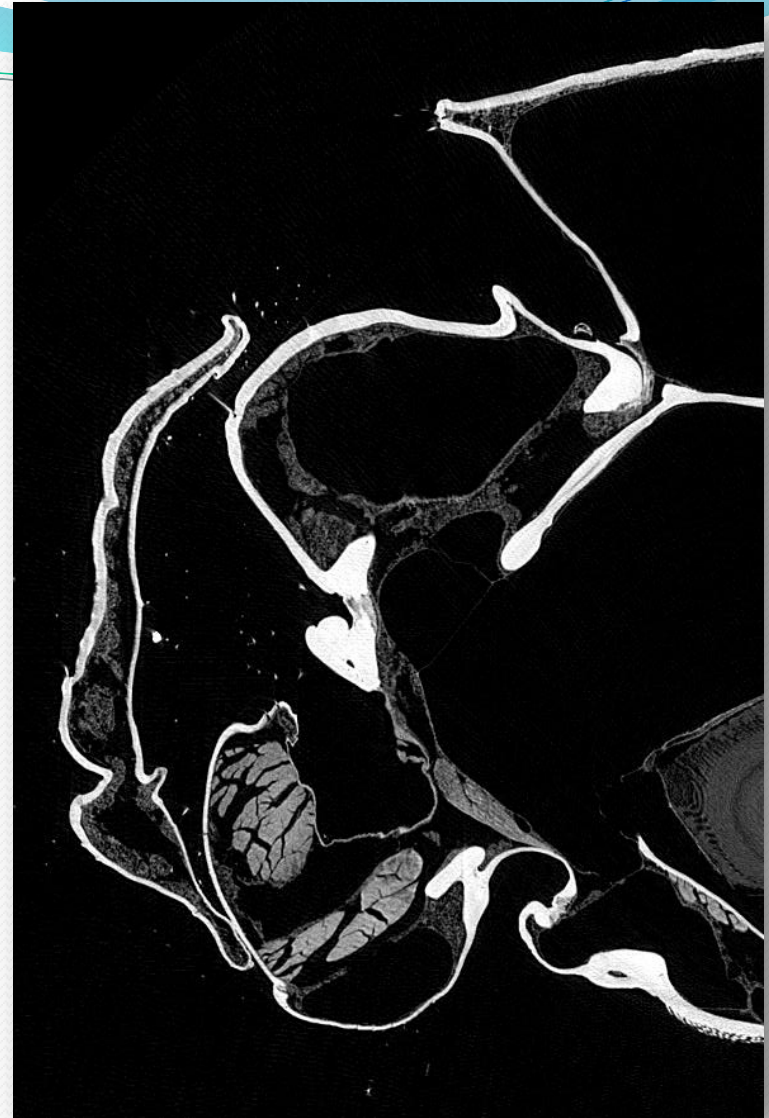
- Function of complicated structures
- Evolutionary constraints

Current research

- Finite-Element-Method (FEM)

Current research

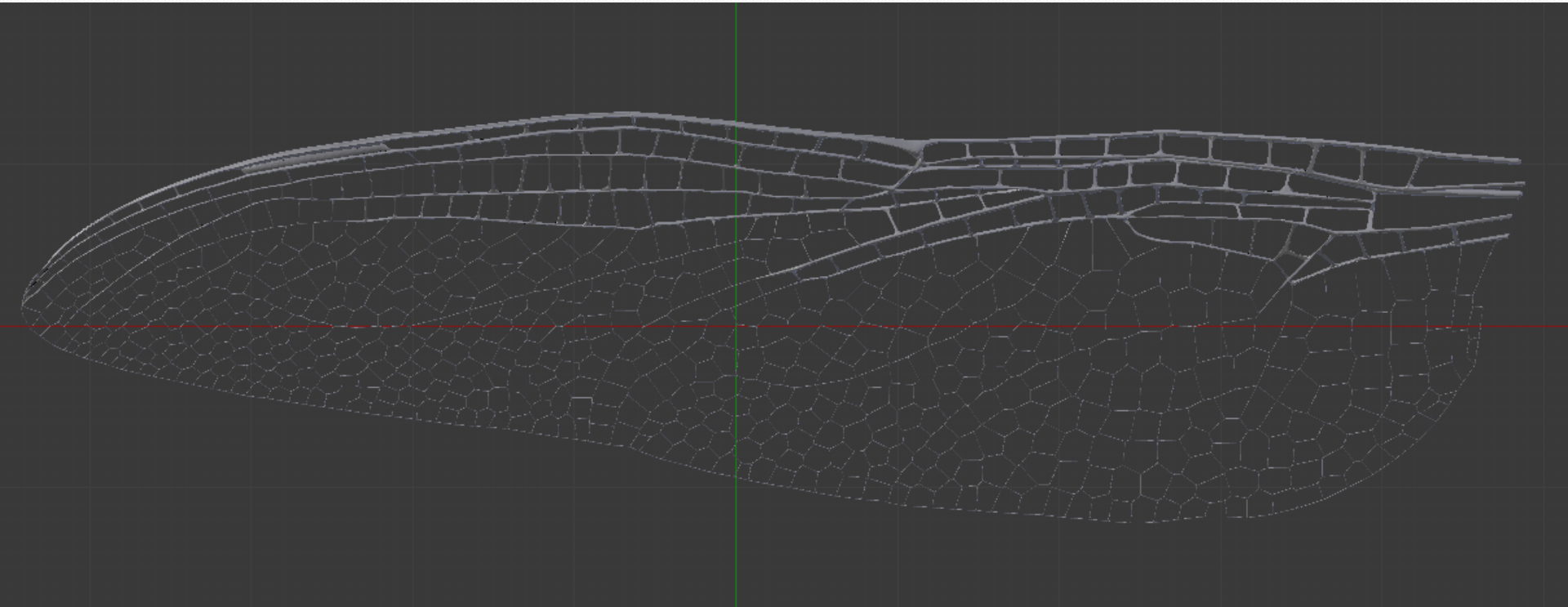
- Finite-Element-Method (FEM)



cuticle of a dragonfly head

Current research

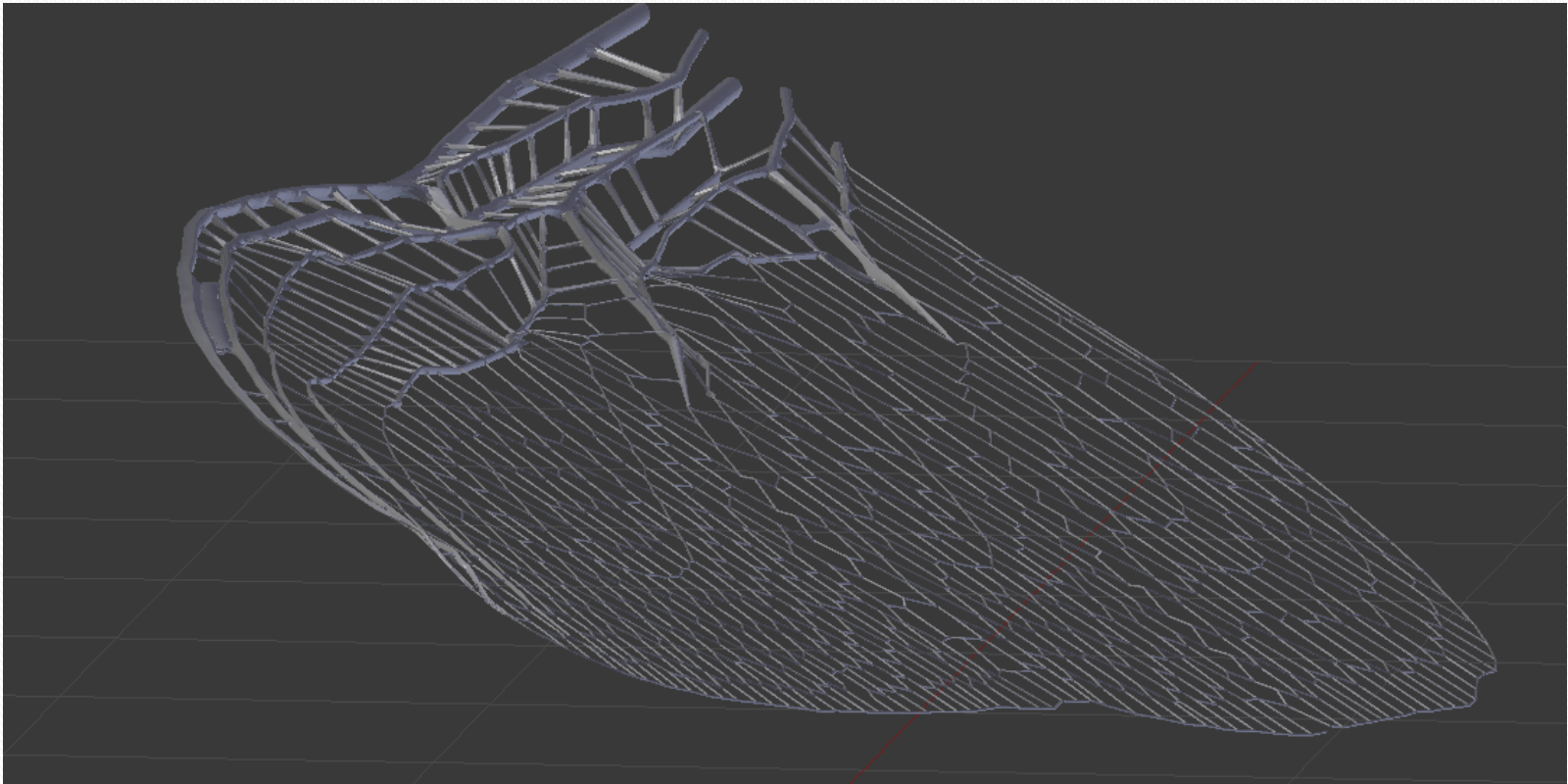
- Finite-Element-Method (FEM)



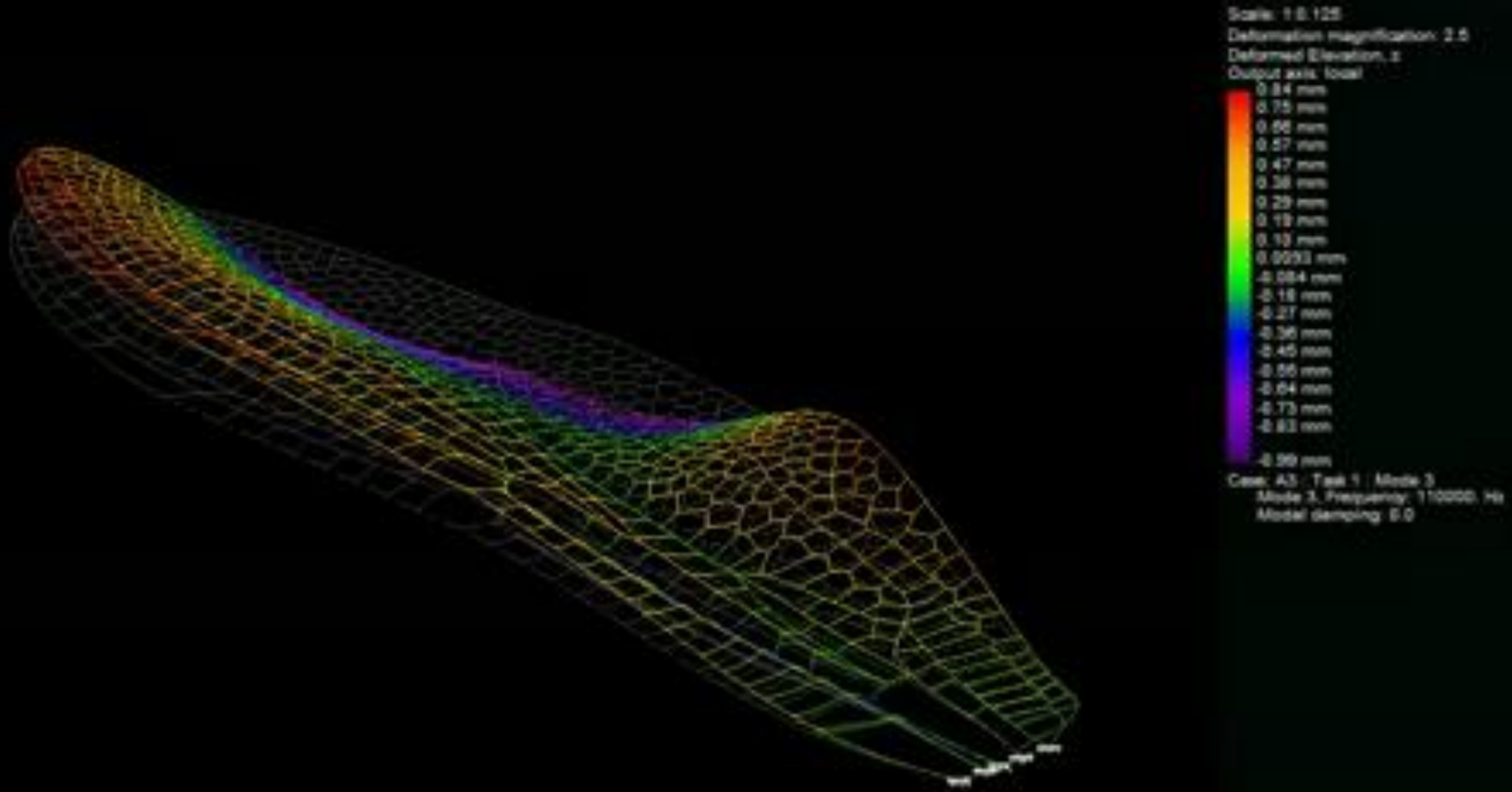
wing of a dragonfly

Current research

- Finite-Element-Method (FEM)



wing of a dragonfly



wing of a dragonfly

Acknowledgements:

- Dr. Felix Beckmann
- Dr. Fabian Wilde
- Dr. Julia Herzen

- Working group, esp.
 - Dr. Alexander Blanke
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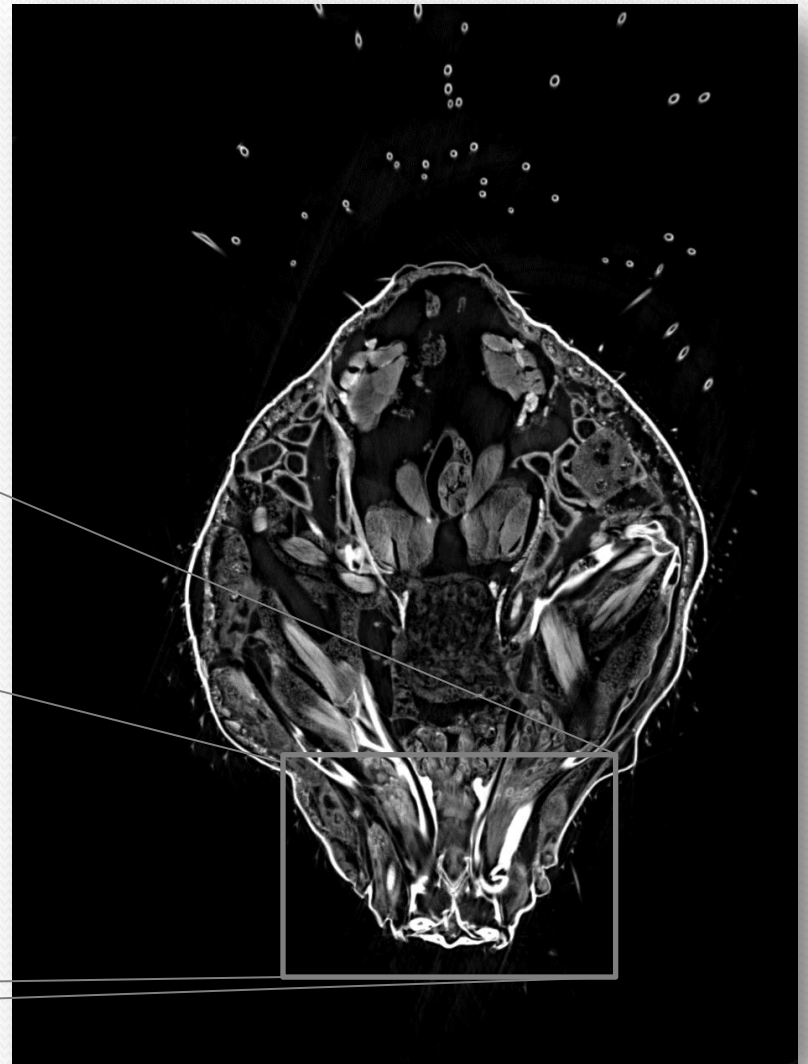
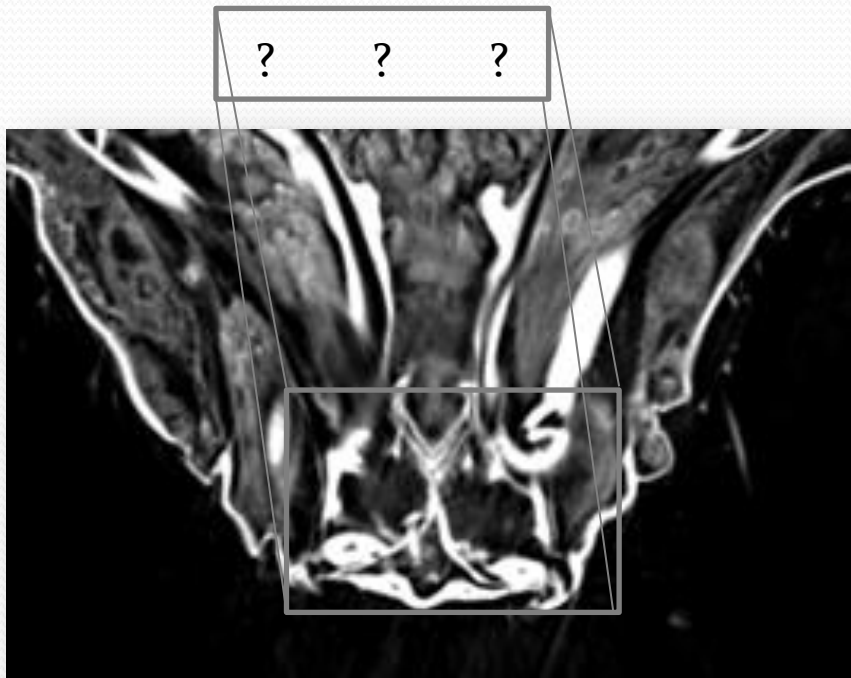
And of course: You!



Important issues & wishes for our research

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- Density resolution



SR-μCT of a springtail head

~ 1 mm

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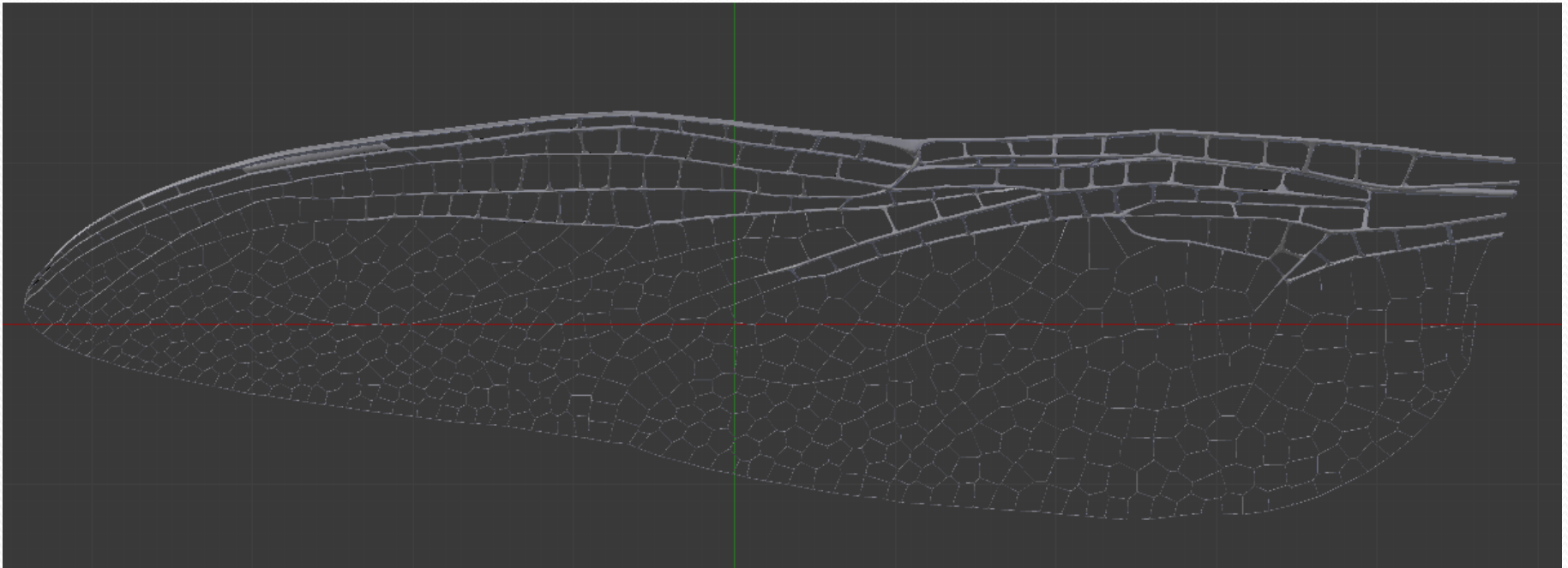
- Density resolution
- Higher flux → shorter exposure times at high magnifications



Pogonognathellus flavescens & *Megalothorax minimus* – Hopkin 2005

Important issues & wishes for our research

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- Higher throughput (e.g. installation of specimen changer)

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- Graphical User Interface?