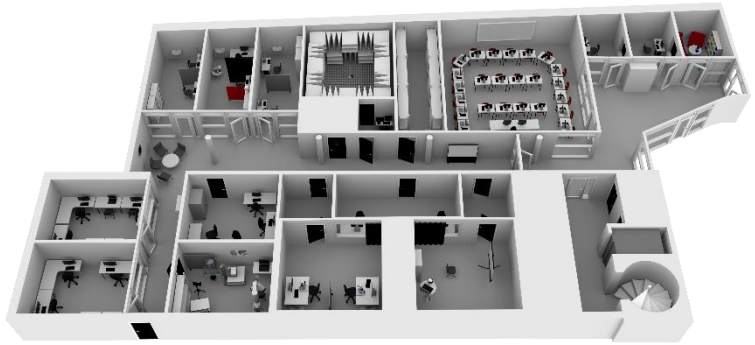
Visualisation using VR

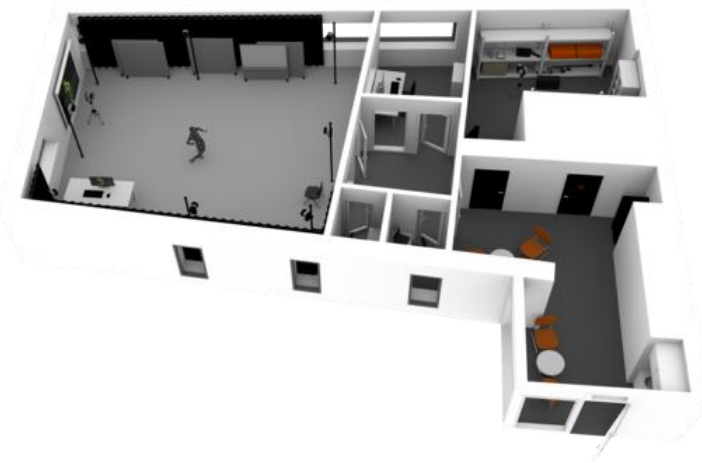
Lund University Humanities Lab

Lund University Humanities Lab

A Research Infrastructure

- Facilities
- Staff 20+
- Users 500+





Lund University Humanities Lab

A Research Infrastructure

- Facilities
  - Articulography
  - Bio Pac
  - EEG
  - MRI
  - Eye-tracking
  - Motion Capture
  - 3D Scanning
  - **Virtual Reality**
  - LARM-studio

  - Project Server
  - Corpus Server
  - Build Server

Lund University Humanities Lab

A Research Infrastructure

- Facilities
  - Articulography
  - Bio Pac
  - EEG
  - MRI
  - Eye-tracking
  - Motion Capture
  - 3D Scanning
  - **Virtual Reality**
  - LARM-studio

  - Project Server
  - Corpus Server
  - Build Server

- Workflows
  - Accessibility
  - Transparency
  - Sustainability

Lund University Humanities Lab

A Research Infrastructure

- Facilities
  - Articulography
  - Bio Pac
  - EEG
  - MRI
  - Eye-tracking
  - Motion Capture
  - 3D Scanning
  - Virtual Reality
  - LARM-studio

  - Project Server
  - Corpus Server
  - Build Server

- Workflows
  - Accessibility
  - Transparency
  - Sustainability

- Teaching and Training
  - Courses (PhD level) **6**
  - Group Tutorials **12**
  - Workshops
  - Consultations **168**
  - Starter’s Kit
  - Guidelines
  - Demos **48**
  - Website

*2019

Lund University Humanities Lab

A Research Infrastructure

- Facilities
  - Articulography
  - Bio Pac
  - EEG
  - MRI
  - Eye-tracking
  - Motion Capture
  - 3D Scanning
  - Virtual Reality
  - LARM-studio

  - Project Server
  - Corpus Server
  - Build Server

- Workflows
  - Accessibility
  - Transparency
  - Sustainability

- Teaching and Training
  - Courses (PhD level)
  - Group Tutorials
  - Workshops
  - Consultations
  - Starter's Kit
  - Guidelines
  - Demos
  - Website

*2019

Lund University Humanities Lab

A Research Infrastructure

- Facilities
  - Articulography
  - Bio Pac
  - EEG
  - MRI
  - Eye-tracking
  - Motion Capture
  - 3D Scanning
  - Virtual Reality
  - LARM-studio

  - Project Server
  - Corpus Server
  - Build Server

- Workflows
  - Accessibility
  - Transparency
  - Sustainability

UX

DIY

- Teaching and Training
  - Courses (PhD level)
  - Group Tutorials
  - Workshops
  - Consultations
  - Starter's Kit
  - Guidelines
  - Demos
  - Website

*2019

Lund University Humanities Lab

Supported VR workflows

- 3D scanning, imagebased 3D-modelling and 3D GIS
- 3D motion capture for VR

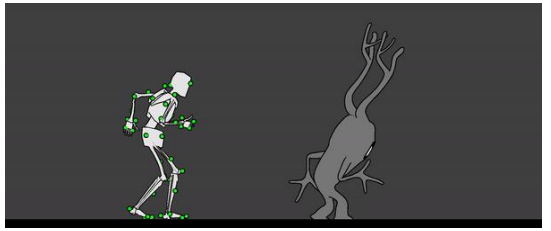
- 3D eye-tracking
- 3D language learning
- VR framework for visualisation of big datasets

LU Archeology
+
LU Humanities Lab
=
TRUE

Lund University Humanities Lab

Supported VR workflows

- 3D scanning, imagebased 3D-modelling and 3D GIS
- 3D motion capture for VR

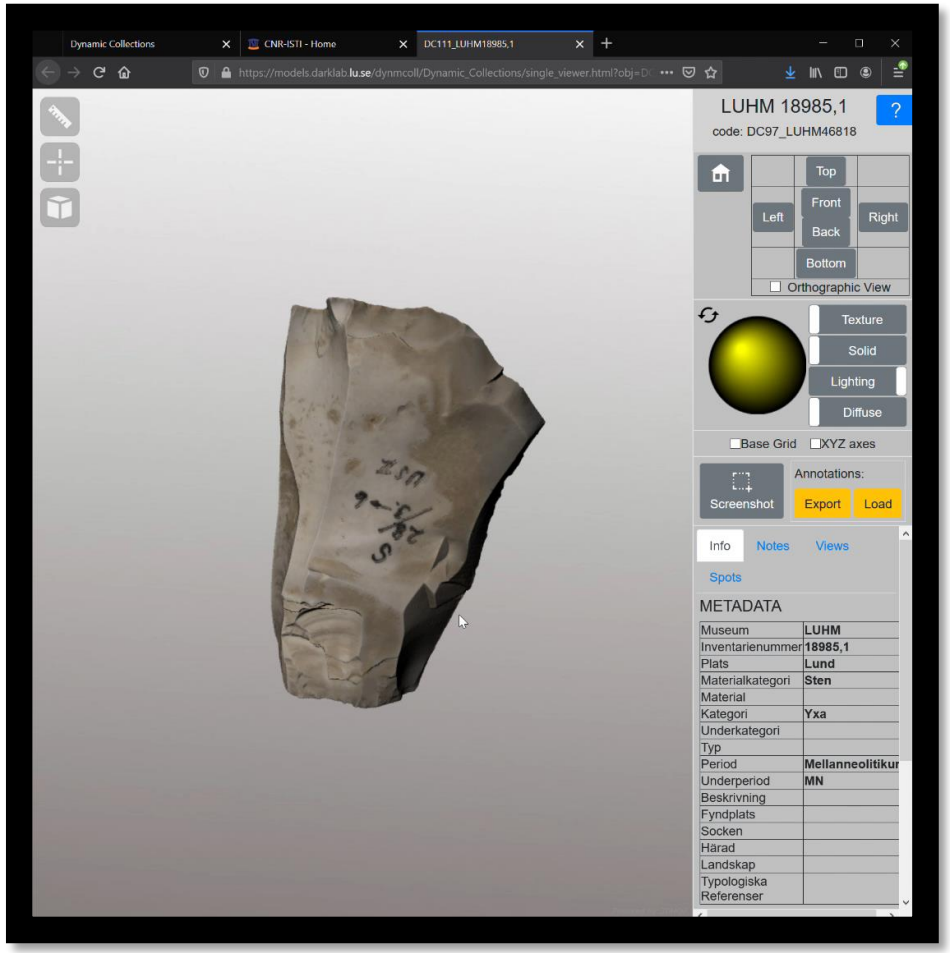


Animation: **Carolina Larsson**, LU Humanities Lab

- 3D eye-tracking
- 3D language learning
- VR framework for visualisation of big datasets

Lund University Digital Archaeology Laboratory DARK Lab

Dynamic Collections project

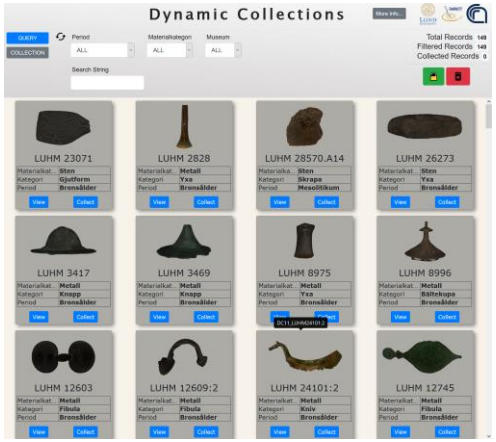


3D database

- 3D-scanning
- Imagebased 3D-modelling

3DHUB

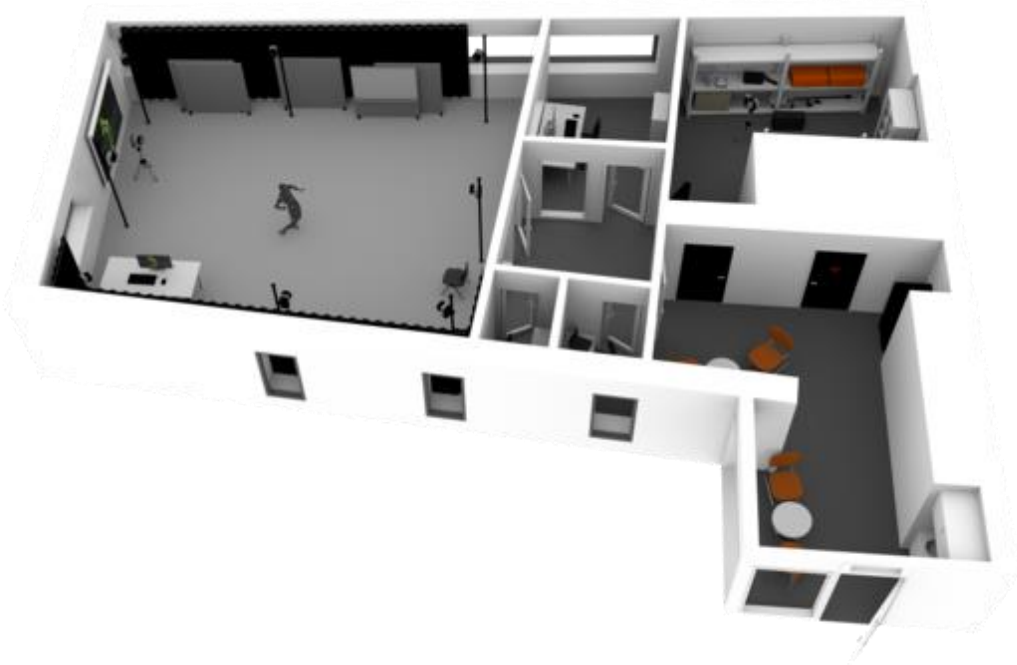
- open source
- free to use



Nicolò Dell'Unto (PI), LU Archaeology and Ancient History

Lund University Humanities Lab

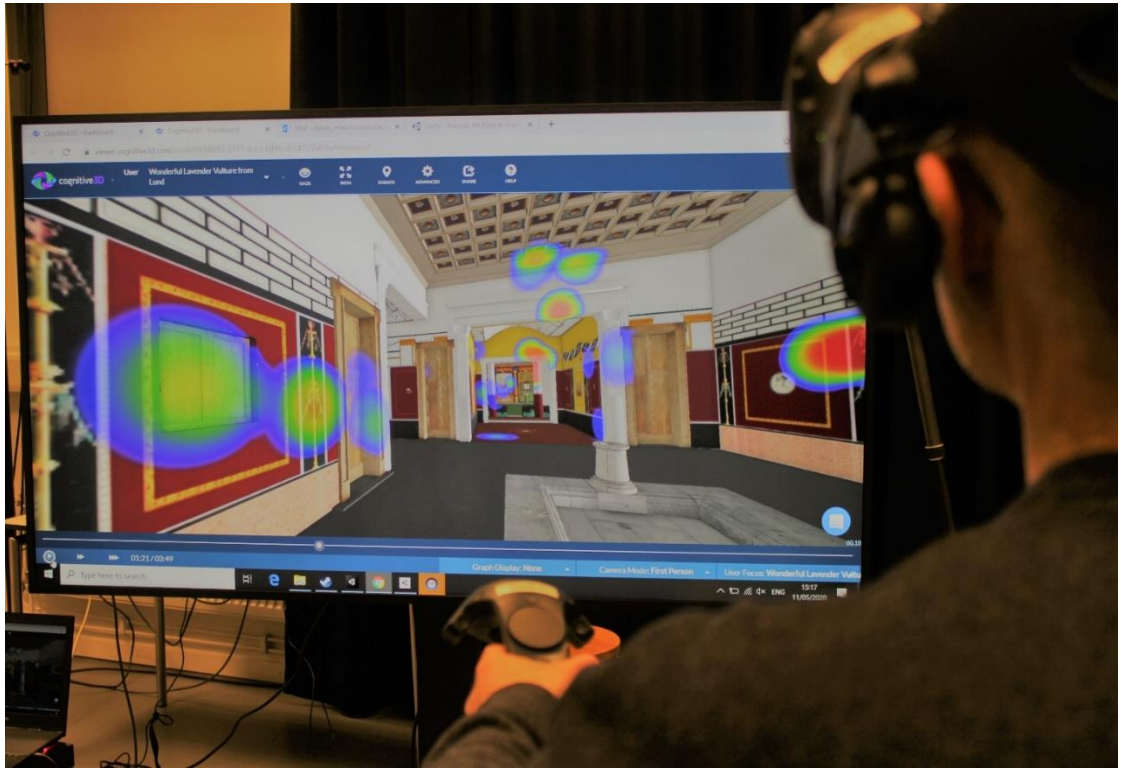
The VR facility



- **Varjo VR-2 Pro** with eye resolution (center), hand- and eye-tracking (high end)
- **HTC Vive Pro**

Case study on visibility

in the Roman house (Pompeii)



Danilo Marco Campanaro, LU Archaeology and Ancient History

Giacomo Landeschi, LU Archaeology and Ancient History + LU Humanities Lab

Language learning and brain plasticity

A study of rapid plasticity and short-term second language learning with the help of VR)

Lara Langensee (PhD candidate), LU Logopedics, Phoniatrics and Audiology
Johan Mårtensson (PI), IKVL/Medfak & LU Humanities Lab
Courtesy of **Alexander Klippel** & **Jiayan Zhao**, Penn State University

A Virtual Reality framework for interactive exploration of complex 3D data

Stefan Lindgren (PI), LU Humanities Lab
Oscar Agertz, LU Astronomy and Theoretical Physics
Henrik Garde, LU Humanities Lab
Mattias Wallergård: LU Design Sciences
Simon Holk: LU Design Sciences
Melvyn B Davies, LU Astronomy and Theoretical Physics
Diederick C Niehorster, LU Humanities Lab
Marcus Nyström, LU Humanities Lab

Courtesy of **Soneji Lab** for sharing**:**
Shamit Soneji
Stefan Lang
Oscar Legetth
Johan Rodhe

Courtesy of the **VR Lab teachers** for the VR course:
Joakim Eriksson
Günter Alce
Mattias Wallergård
Simon Holk

A Virtual Reality framework for interactive exploration of complex 3D data

Stefan Lindgren (PI), LU Humanities Lab
Oscar Agertz, LU Astronomy and Theoretical Physics
Henrik Garde, LU Humanities Lab
Mattias Wallergård: LU Design Sciences
Simon Holk: LU Design Sciences
Melvyn B Davies, LU Astronomy and Theoretical Physics
Diederick C Niehorster, LU Humanities Lab
Marcus Nyström, LU Humanities Lab

Courtesy of **Soneji Lab** for sharing**:**
Shamit Soneji
Stefan Lang
Oscar Legetth
Johan Rodhe

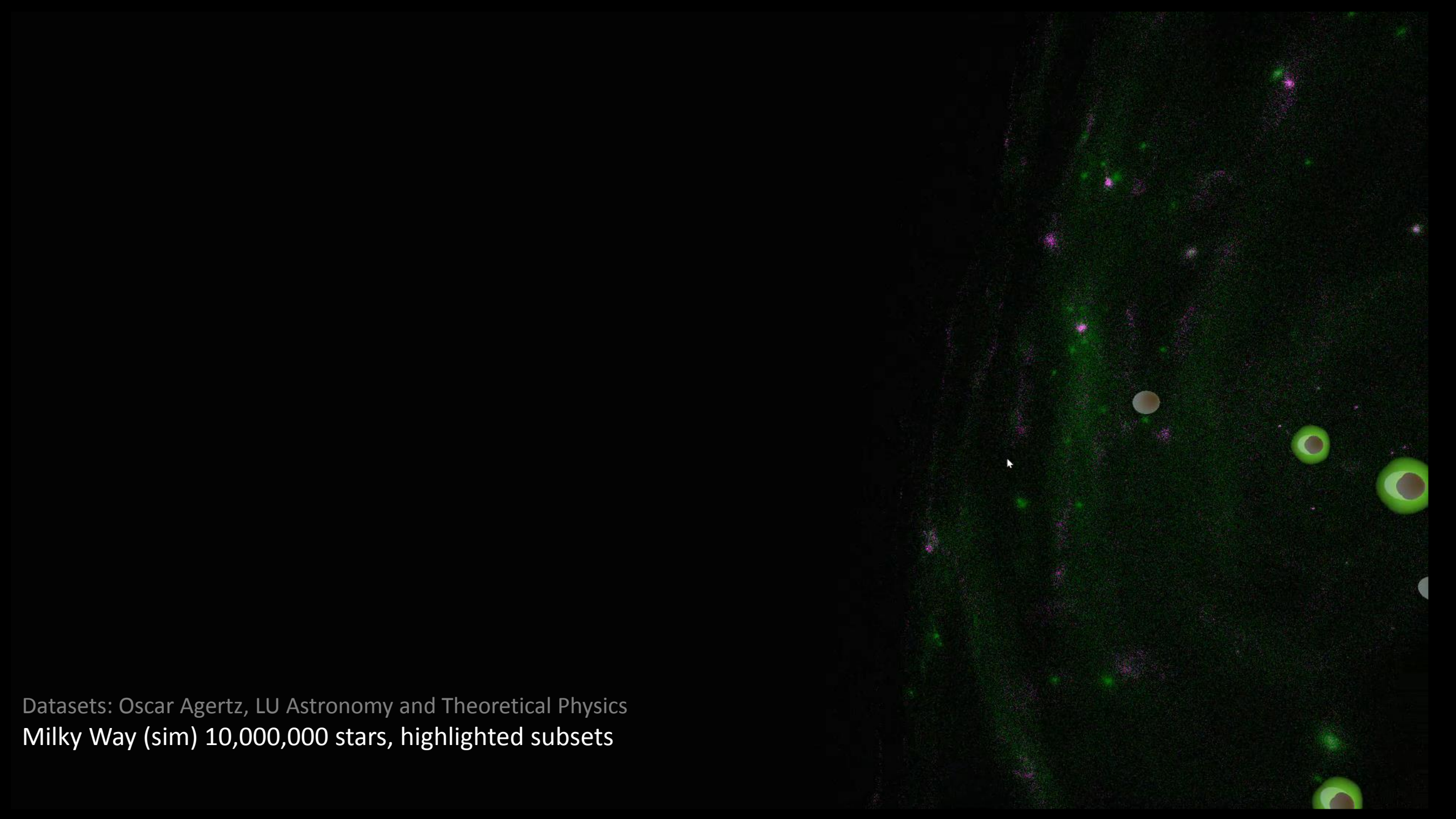
Courtesy of the **VR Lab teachers** for the VR course:
Joakim Eriksson
Günter Alce
Mattias Wallergård
Simon Holk

A Virtual Reality framework for interactive exploration of complex 3D data

Stefan Lindgren (PI), LU Humanities Lab
Oscar Agertz, LU Astronomy and Theoretical Physics
Henrik Garde, LU Humanities Lab
Mattias Wallergård: LU Design Sciences
Simon Holk: LU Design Sciences
Melvyn B Davies, LU Astronomy and Theoretical Physics
Diederick C Niehorster, LU Humanities Lab
Marcus Nyström, LU Humanities Lab

Courtesy of **Soneji Lab** for sharing**:**
Shamit Soneji
Stefan Lang
Oscar Legetth
Johan Rodhe

Courtesy of the **VR Lab teachers** for the VR course:
Joakim Eriksson
Günter Alce
Mattias Wallergård
Simon Holk



Datasets: Oscar Agertz, LU Astronomy and Theoretical Physics

Milky Way (sim) 10,000,000 stars, highlighted subsets

Data sets: Anders Lansner, Tino Weinkauf, et al, KTH, Computional Brain Science Lab

Brain (sim) 2x2 mm Geometry: 1,485,251 Spike events: 10,836,157 18 s

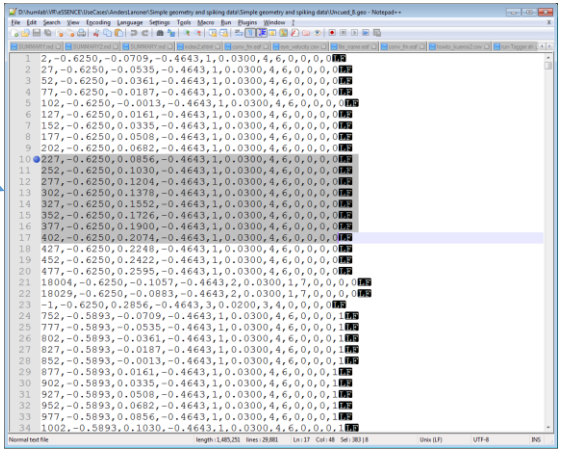
Curtesy of data suppliers!

- Oscar Agertz, LU Astronomy and Theoretical Physics
- Alexey Bobrick, LU Astronomy and Theoretical Physics
- Joanne Yager, LU Centre for language and Literature
- Jonas Ahlsted, LU Bioimanging Centre (LBIC)
- Paul Bourgine, LU Molecular Skeleton Biology
- Anders Lansner, Tino Weinkauf, et al, KTH, Computional Brain Science Lab
- Kate Mesh, LU Centre for language and Literature
- Giorgi, LU Astronomy and Theoretical Physics
- Daniel Nilsson, LU Theoretical Physics

See you post pandemic!

VR framework concept

- Walk-in dataset
  - Simple datasets are recoqnised
  - Complex datasets are guided outside the VR-headset
  - Some datasets needs readyness processing
  - Use favorit data editor or IDE to do subsettings
  - .xml project file provided to save preferences
- Starter’s Kit
  - Data samples for users
  - Code samples for programmers
- Entry level:
  - As easy as reading and plotting a dataset using Python



LU VR teams

3D/VR Studio @ LU Humanities Lab

VR lab @ Design Sciences

Soneji Lab @ Faculty of Medicine /BMI

DARK Lab @ Archaeology

Thanks!

henrik.garde@humlab.lu.se