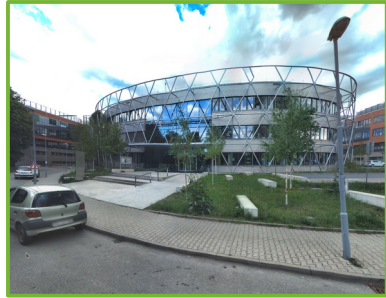# Vladimír (Vlado) Ulman

Mastodon – DeepLineage kick off
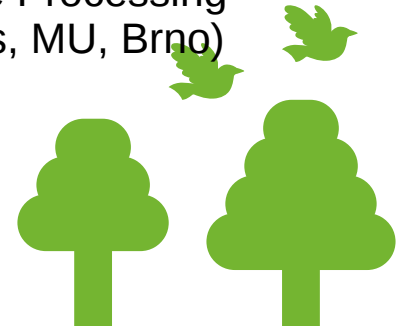25th Feb 2022, online

About Vlado:

- Applied Computer Scientists & Mastodon + Imglib2 believer
- Image processing & analysis, big images in parallel
- Algorithms benchmarking (synth. data)
- Support for DL methods training (silver ground-truth)

- Central European Institute of Technology (CEITEC, Masaryk University, Brno)

- Centre for Biomedical Image Processing (CBIA, Faculty of Informatics, MU, Brno)
- CellTrackingChallenge.net

- IT4Innovations National Supercomuting Center (IT4I, VSB – Technical University of Ostrava, Ostrava)
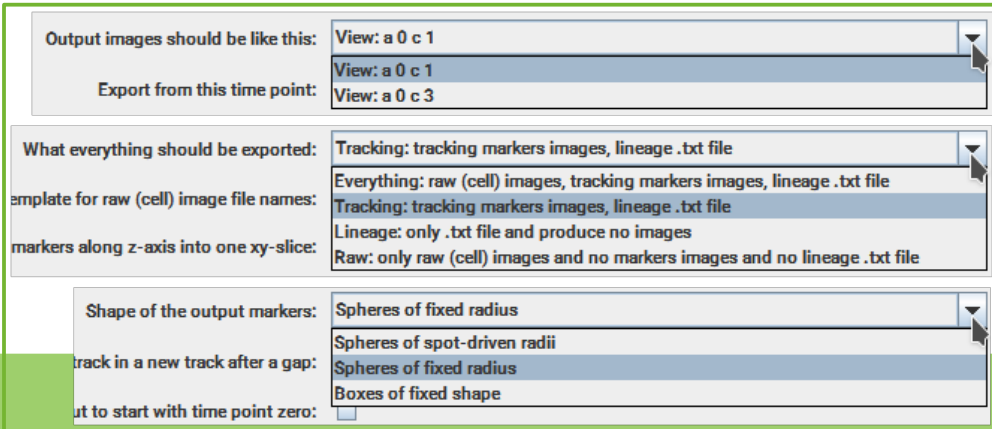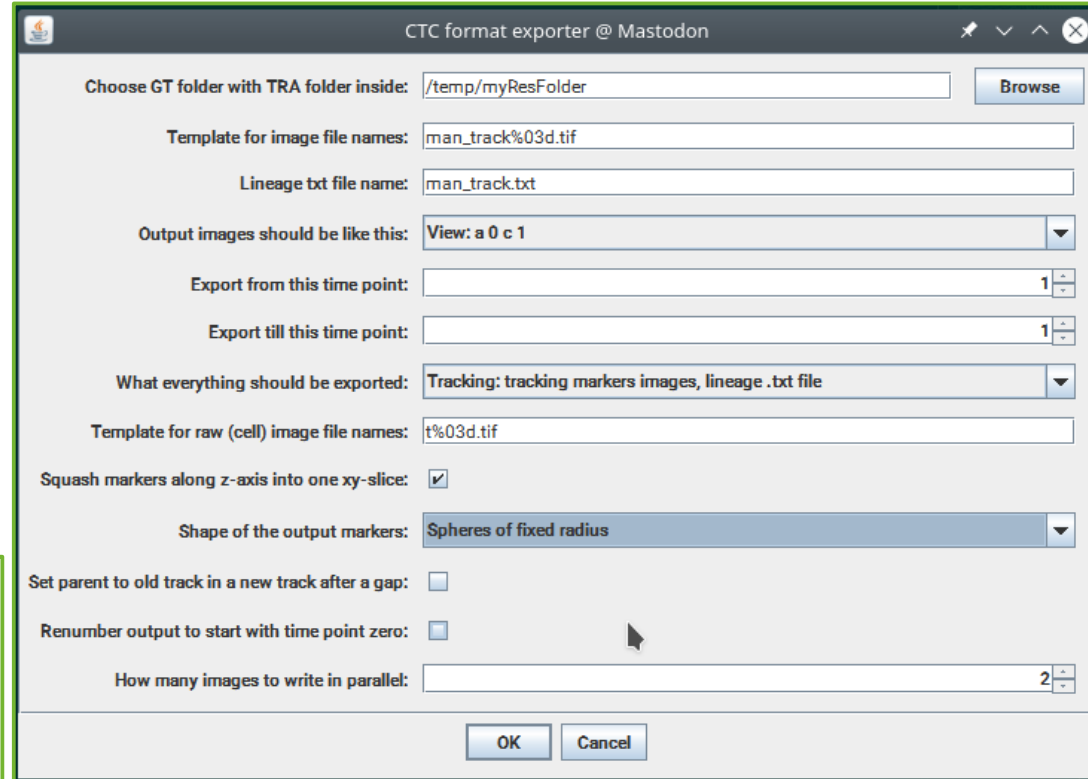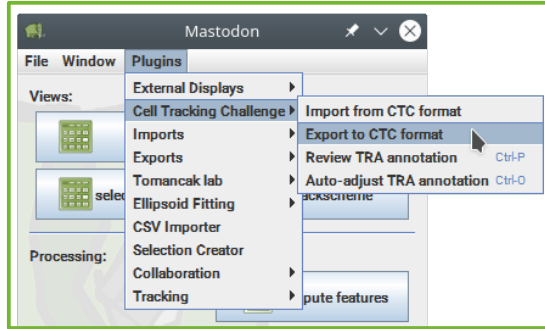- HPC Workflow Manager (for Fiji) + DataStore

Mastodon contra Vlado, history:

- I/O plugins (oldest, 2018)
    - Point coords/clouds in CSVs ↔ spots in Mastodon
    - Import spots from instance segmentation + overlap-based tracking
    - I/O for Cell Tracking Challenge
- SciView visualization (2020)
- Collaborative tracking (2020)
- Shared images via DataStore (2021)
- Blender visualization (newest, 2021)
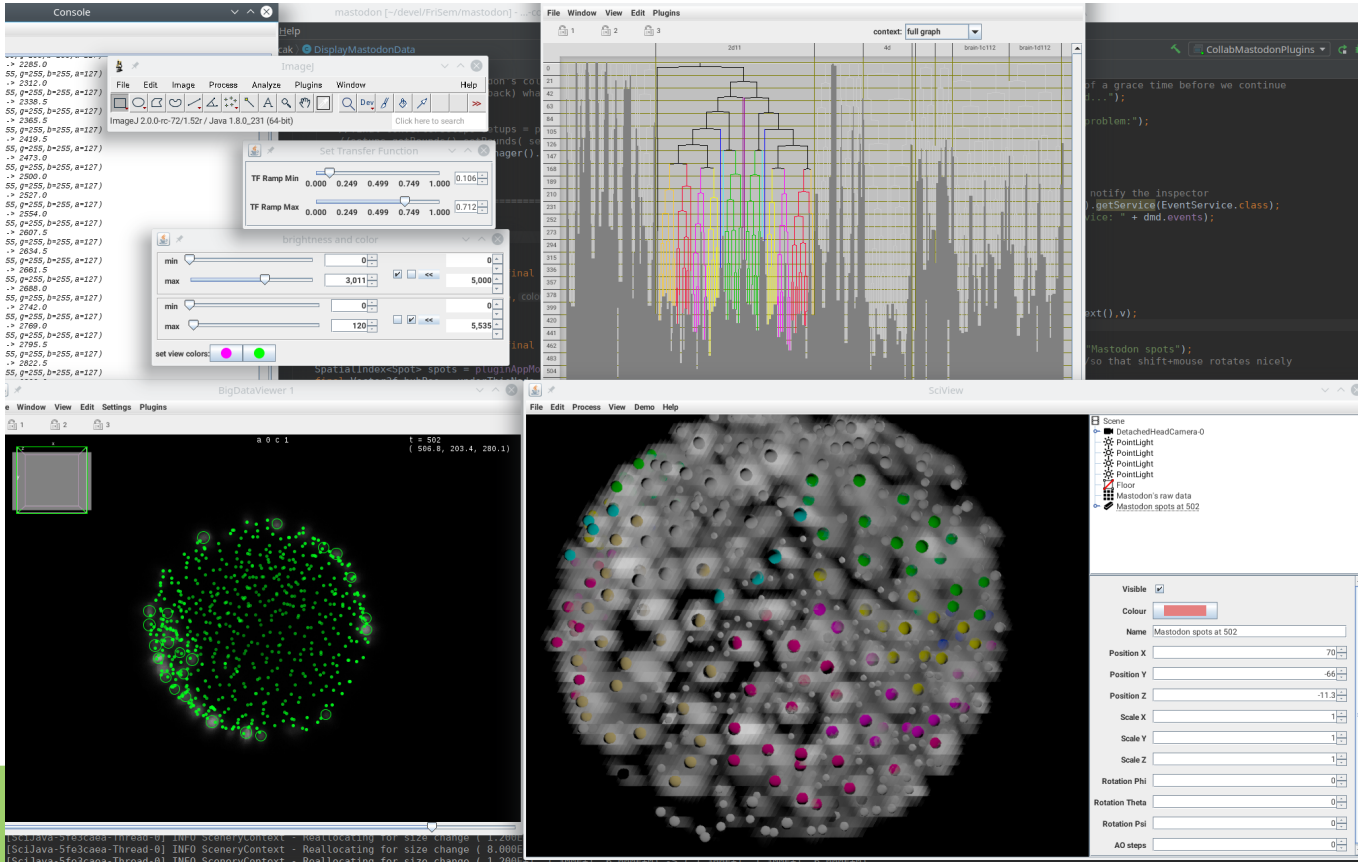
Mastodon contra Vlado, history:

- ## I/O plugins (oldest, 2018)
  - ### I/O for Cell Tracking Ch.

Mastodon contra Vlado, history:

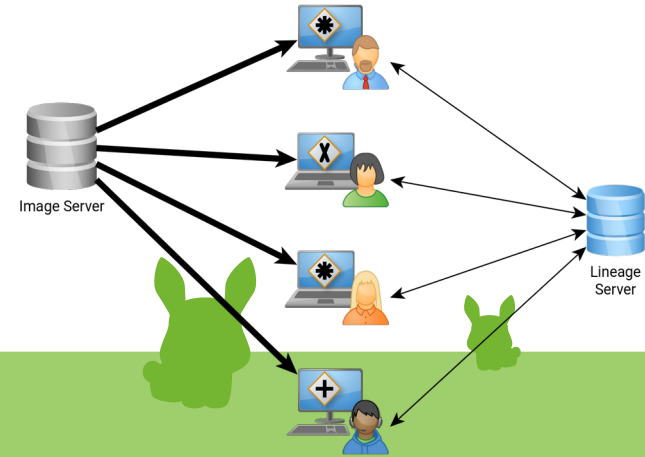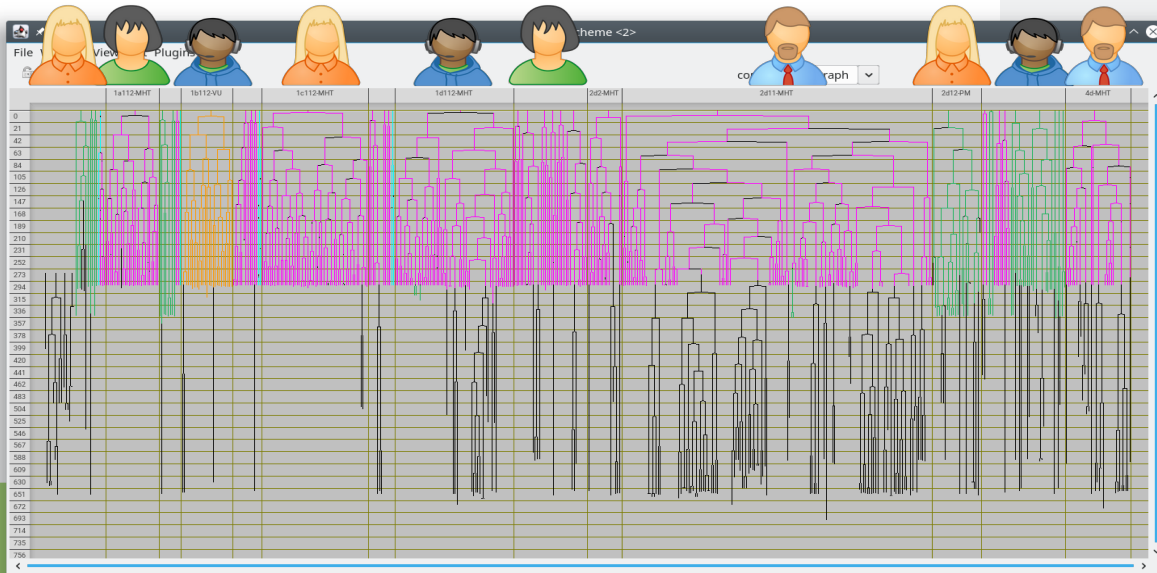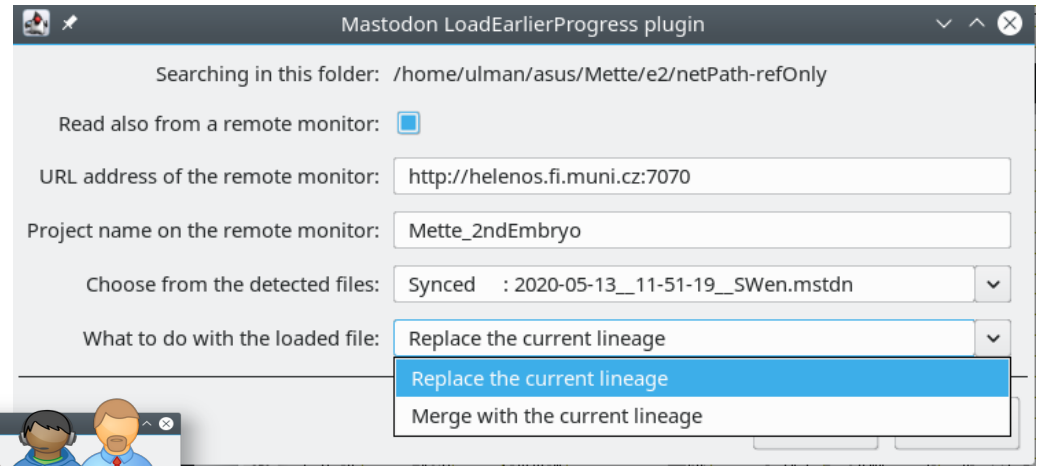- SciView visualization (2020): featuring tag colors, vol. rendering, spots, trajectories, adjustable vizu, interconnected!

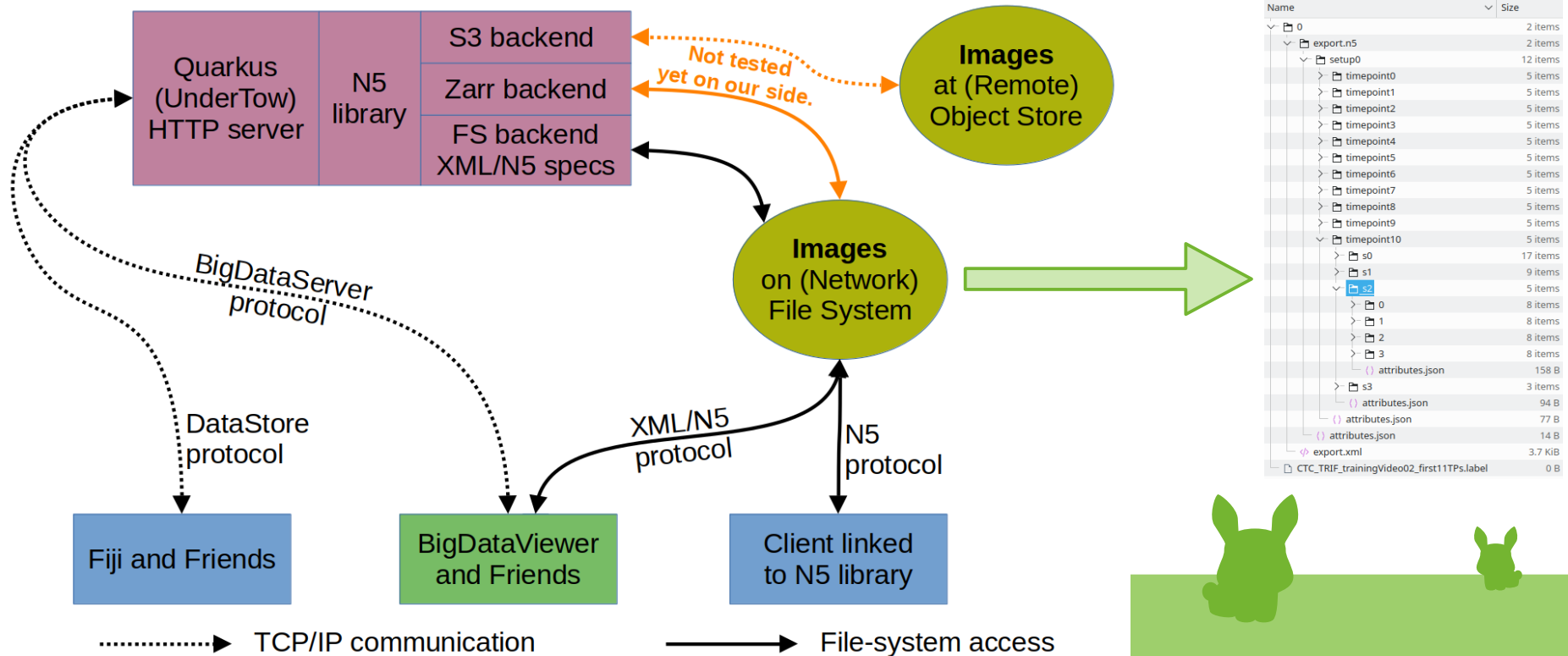 also: fragile, HW heavy, unstable

Mastodon contra Vlado, history:

- Collaborative tracking (2020):

  I/O works, server works, merging is a pain

Mastodon contra Vlado, history:

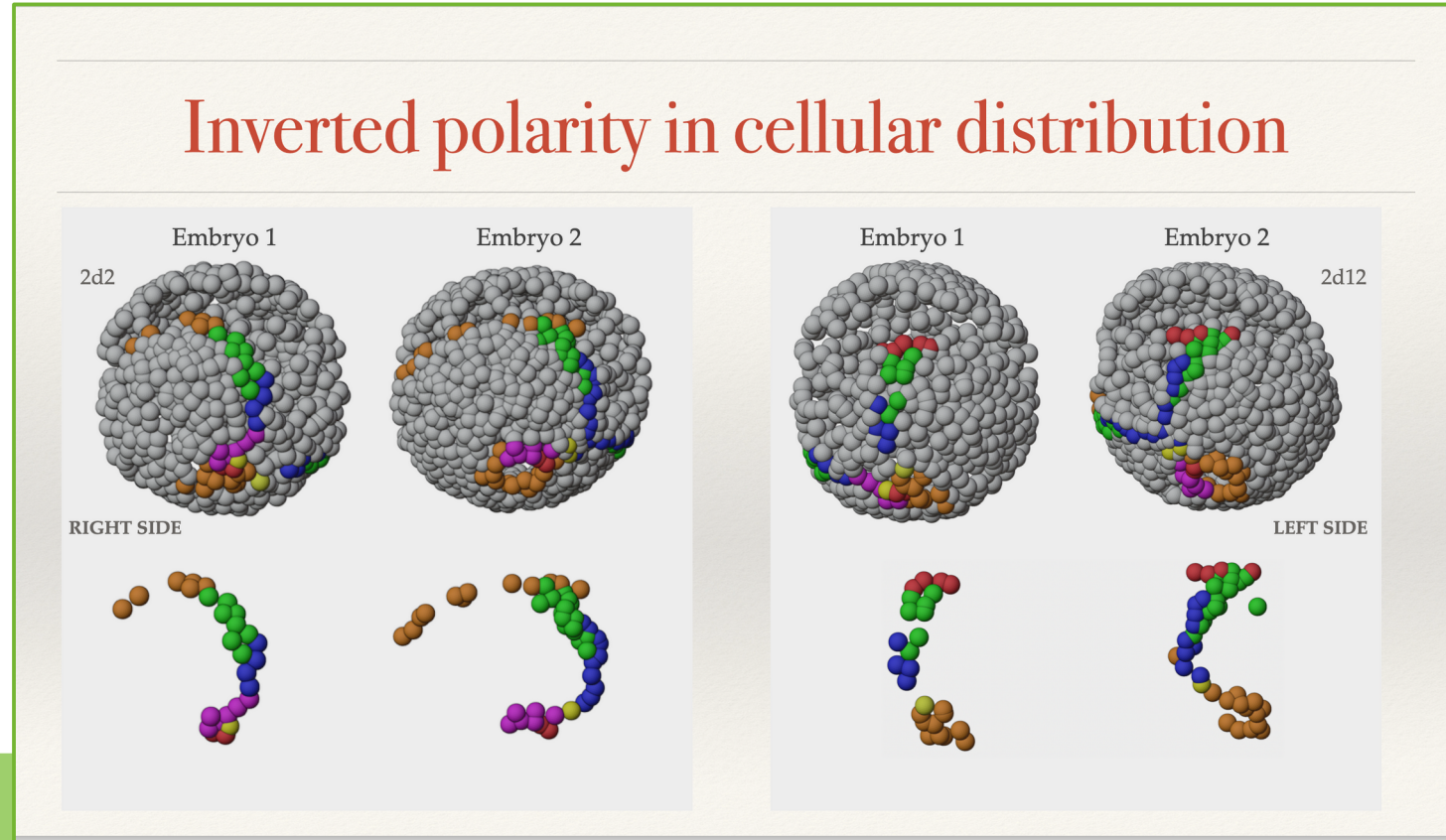- Shared images via DataStore (2021): works & smoothing edges

Mastodon contra Vlado, history:

- Blender visualization (newest, 2021):

  stable, known, advanced…

  overwhelming, google-able

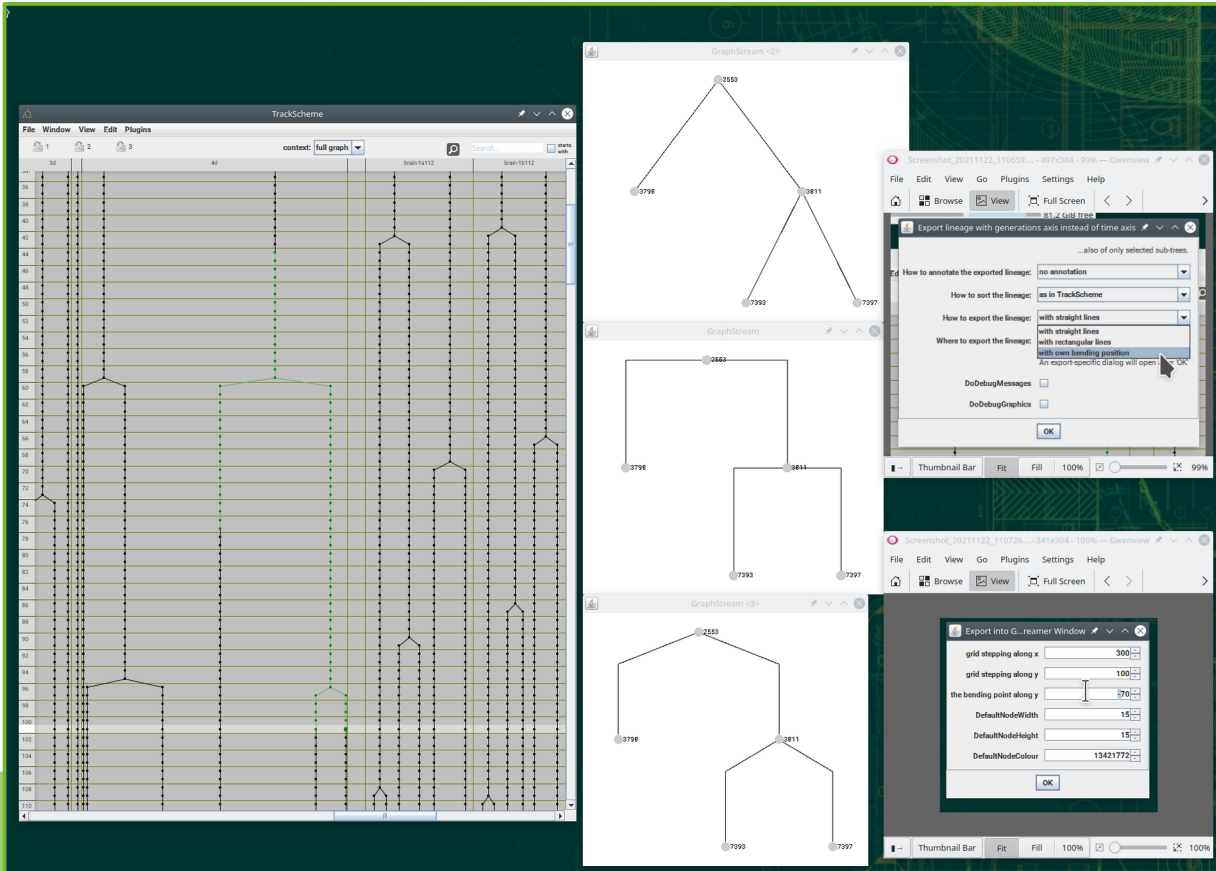 capable, performant

Inverted polarity in cellular distribution

Embryo 1   Embryo 2   Embryo 1   Embryo 2

2d2

RIGHT SIDE

2d12

LEFT SIDE
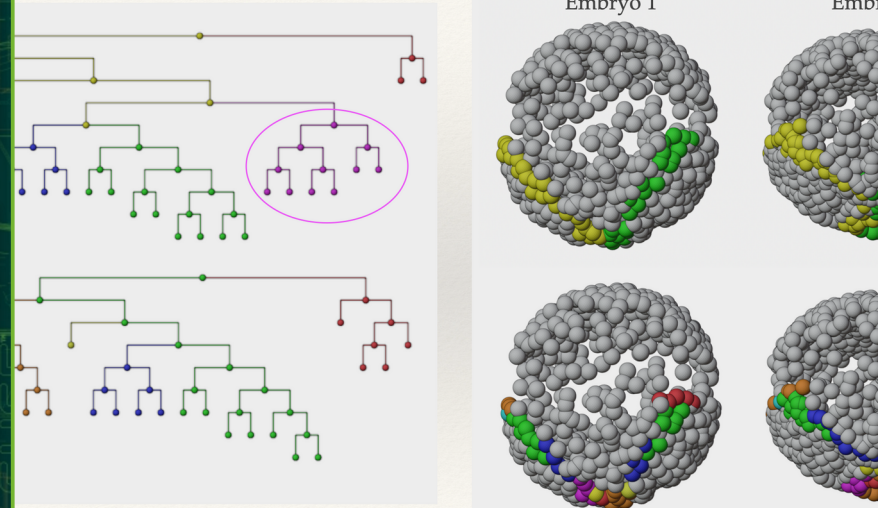
Mastodon contra Vlado, history:

- Blender visualization (newest, 2021):   lineage vizu (options)

Mastodon contra Vlado, history:

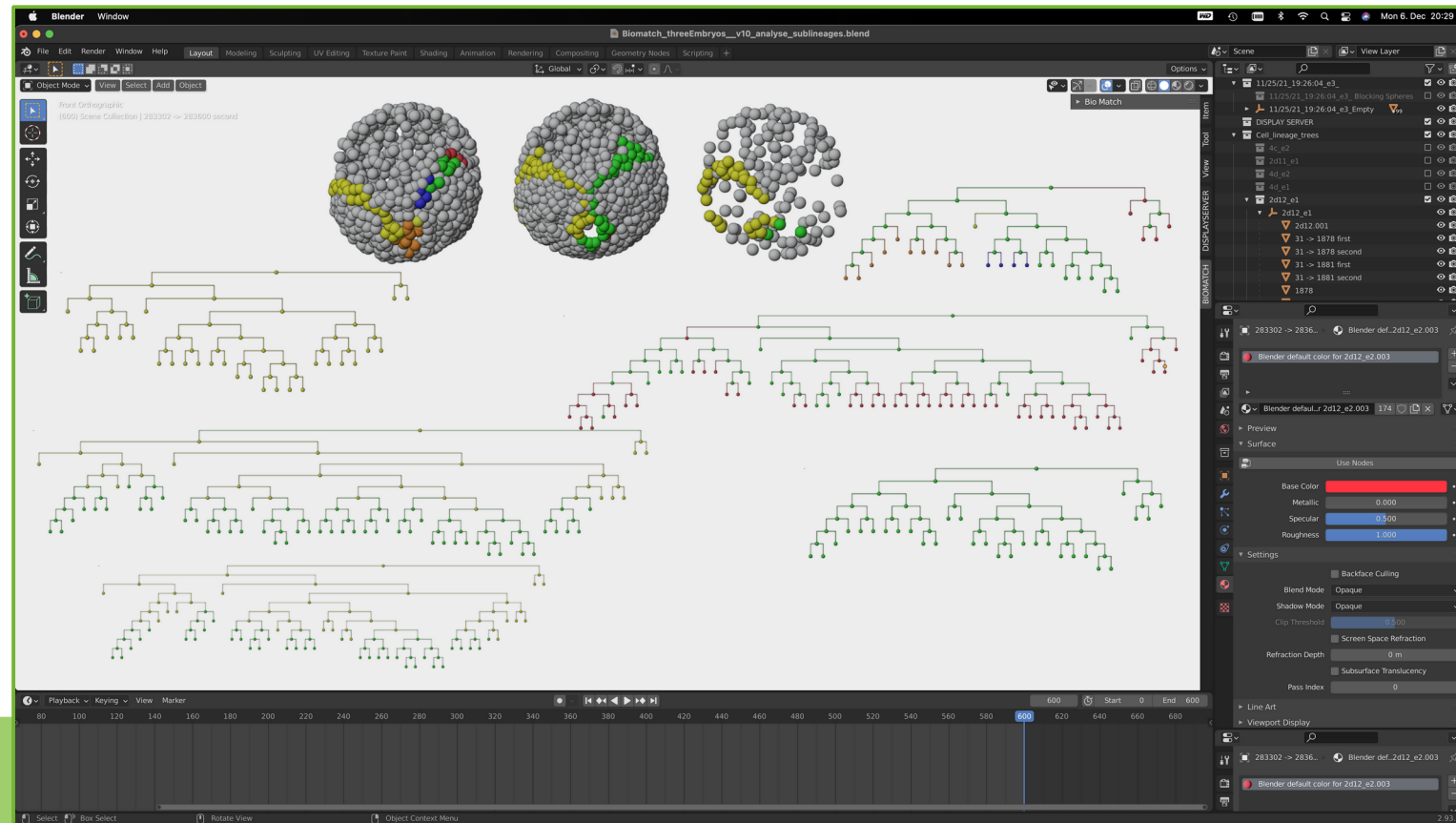- Blender visualization (newest, 2021):   comparing trees (4K LCD)

Mastodon contra Vlado, history:

- Blender visualization (newest, 2021): flexibility, animations, interactivity,

  ATM: <u>very</u> much a prototype

Mastodon contra Vlado, wishes:
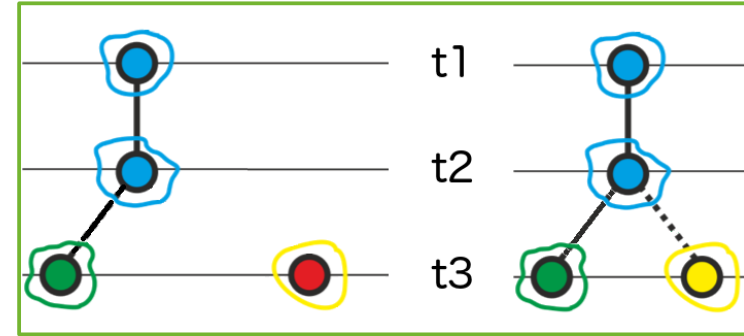
- CellTrackingChallenge
    - SEG, DET, TRA measures
    - Tracking (reference) annotation, annotation review & fixes

- Inter-process communication API for
    - Data sharing (images & tracks)
    - Events sharing (synchronized views, focus events)

- Python access for track analyses
    - No-compilation → Faster development
    - More popular, attractive
    - Deep-learning friendlier

Mastodon contra Vlado, wishes:

- CellTrackingChallenge
  - SEG, DET, TRA measures
    - Useful for tracking alg. developers
      - → coupled with "inspect/review feature"
    - Informative for users
      - → can discover zones of good/bad alg. functionality (color coding SEG)
    - Useful for lineage analyses
      - → DET, TRA quantify differences between two lineages

  - Tracking (reference) annotation, annotation review & fixes
    - May offer a de facto standard format for storing+sharing tracking data
      - → current one is image-centric (and thus "heavy")
    - "Cases review panel" – brings user over "reported cases"
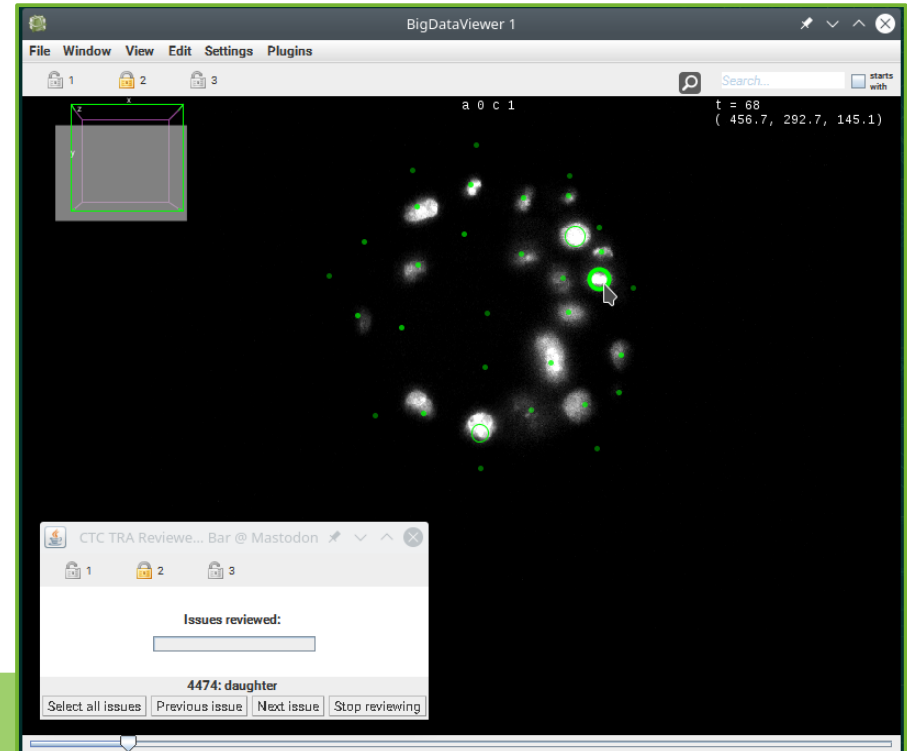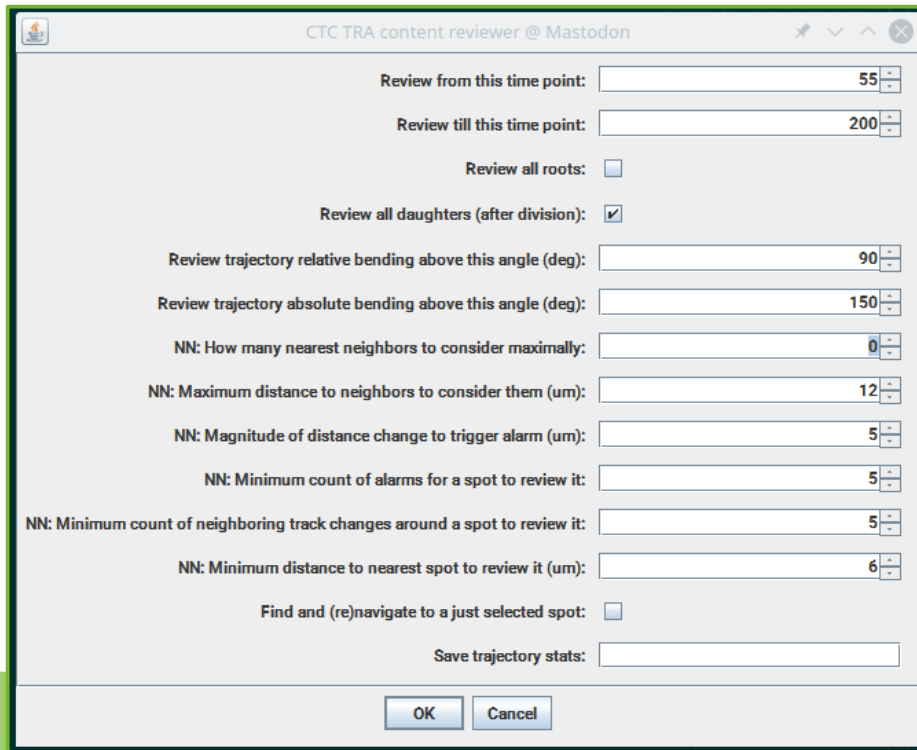   - → ...detection of anomaly in tracks

Mastodon contra Vlado, wishes:

- CellTrackingChallenge
  - SEG, DET, TRA measures
    - Useful for tracking alg. developers: "inspect/review feature"

Mastodon contra Vlado, wishes:

- Inter-process communication API for

  - Data sharing

    - Images: S3 (cloud), DataStore (server), local storage – .one.zarr files
    - Tracks: "Matthias – GIT for lineage"
    - Full and partial (per partes) data
    - ...to/from 3rd-party SW   ...data interoperability

  - Events sharing

    - Synchronized views
    - Focus events   ...between SWs 'cause "vizu means data reduction"

  - Bonus:

    - Across prog. languages, across computers…   rooms…   institutes
    - Enables: ext. visualization and/or parallel computing

Mastodon contra Vlado, wishes:

- Python access (to Mastodon internals) for track+img analyses

  - No-compilation → Faster development
    - → e.g. don't need to re-open project & re-navigate to somewhere

  - More popular, attractive
    - → feeling: currently general more interest in Python than Java programing

  - Deep-learning friendlier
    - → Python is the home of deep learning (of anything… not only cell seg.)

  - Essentially done… needs more education and enlightenment

  - Bonus: IT4I's HPC Workflow manager is designed/oriented towards macros and Jython…