

# Next generation imaging

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# Redefine the concept of impact



# Academic vs Clinical reality



# Some questions for on the road

- How to get advanced technology working in a regional hospital?
- How to add value through quantification?
- How to aid clinical decision-making through advanced data representation?

# Imaging-based quantification in routine medicine

# Automation of quantification in a regional hospital



Van Leeuwenhoek



Royal Society, 1673

+



Coulter

US-Patent 2656608, 1953

=



- **Callibrated**
- **Automated**
- **Quantified**

# And in Imaging?

- Academic setting: adverse reward system
- Medicine: limited time for research (lack of experts)
- Huge gap between requirements and available

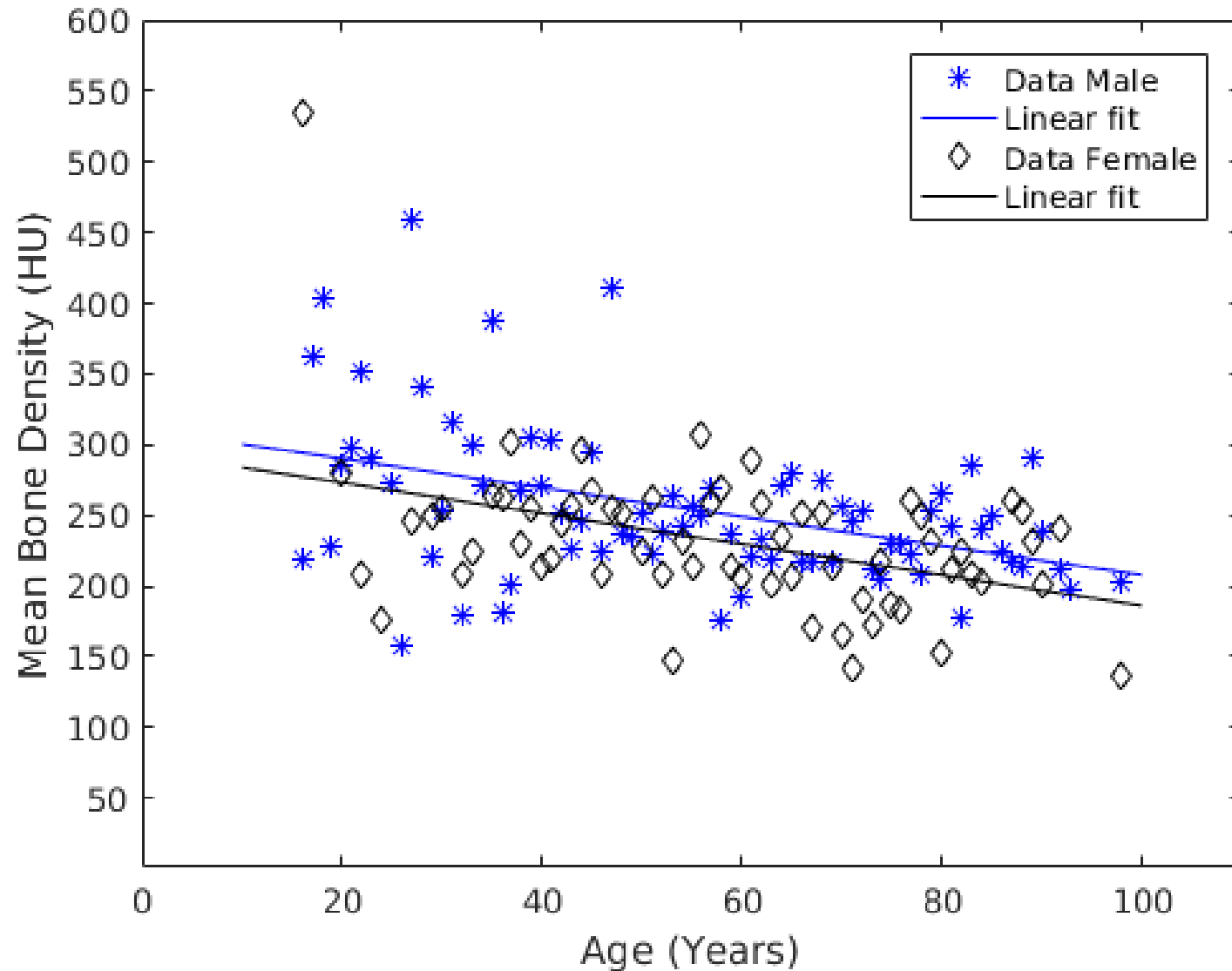
high quality data

# Do the dirty work first!





# Create real problems



# Aim for clinical integration

4Quant LungStage Annotation Tool v30170203

Tumor Custom T1 T2 T2\_main\_bronchus T2\_visc\_pleura T2\_obstr\_lobe T3\_inv\_chest\_wall T3\_main\_bronchus T3\_obstr\_lung

Node Custom N1\_10-11i N1\_12-15i N2\_2i N2\_3 N2\_4i N2\_5 N2\_6 N2\_7 N2\_8i N2\_9 N3\_1 N3\_2c N3\_4c N3\_5c N3\_6c

Metastases Custom M1a\_contralat M1a\_pleura M1b\_adrenal M1b\_brain M1b\_liver M1b\_bone M1b\_node M1b\_other

Load PET/CT Date Slice Viewer DICOM Subjects Volumes

Reapply Standard Settings  Show PET (bg) Just CT CT Window: Soft Tissue L:40 W:400 Save Segmentations

Syngo Standard View  Crosshair  Swap Foreground / Background Just PET PET Window: Heat (Log) L:5 W:10 Resume Segmentations

Slicer Standard View PET Visibility (%): 50

Annotation vs Reading

Staging Information

Please fill out the form to indicate the stage for the current patient

\* Erforderlich

ACCESSION NUMBER  
135817491628265E

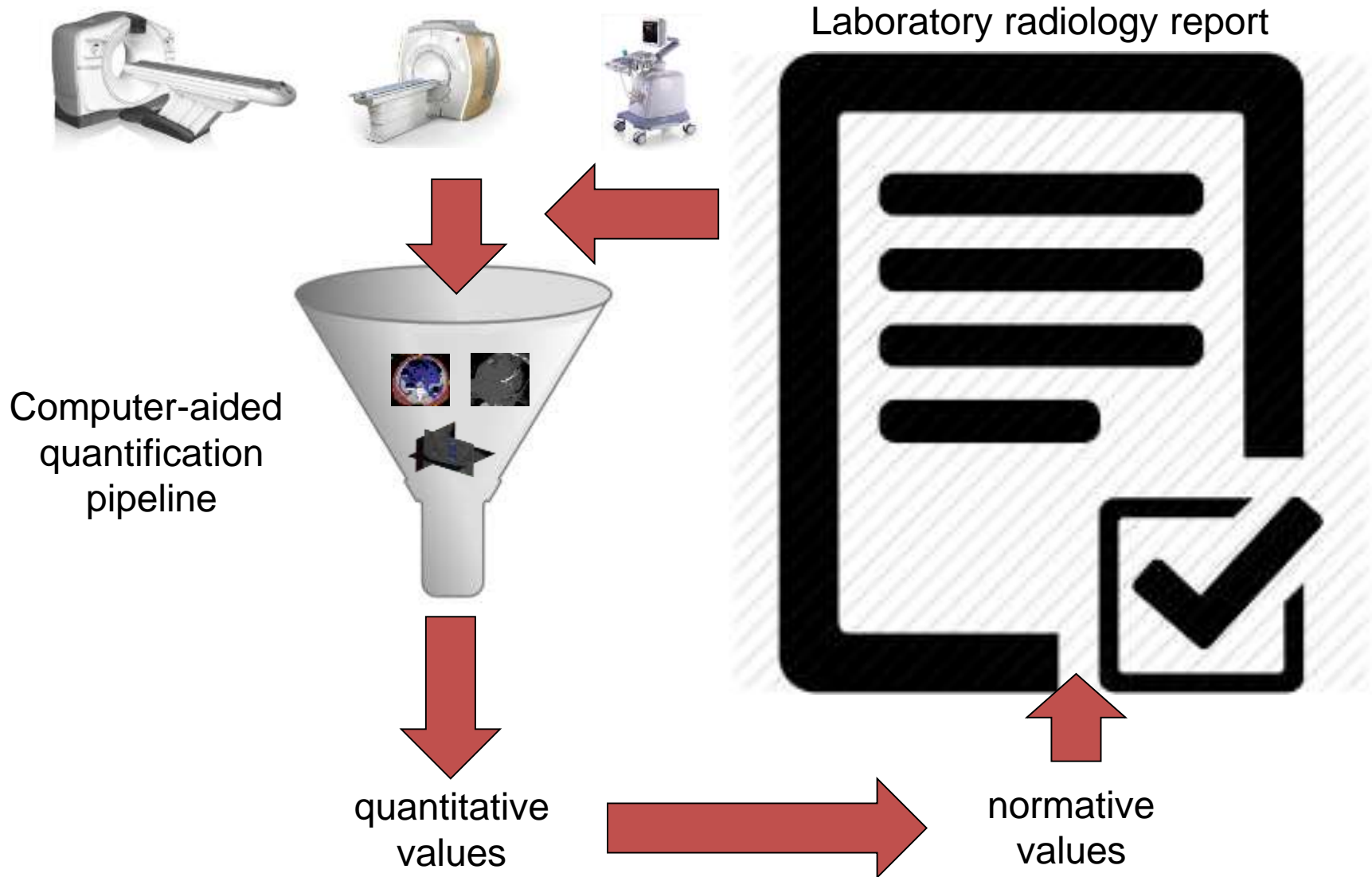
Author Name  
Kevin

Exclusion Criteria (can be multiple)  
Show the exclusion, or patient be excluded, if it should be excluded in a previous case that we could use later

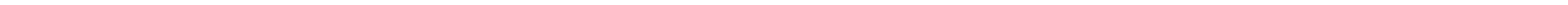
INVALID DATA  
 INVALID CASE  
 INVALID PATIENT  
 RECURRENCE

Create Label Table

# Laboratory radiology



# Patient Virtualization



# Inspiration from anatomy class

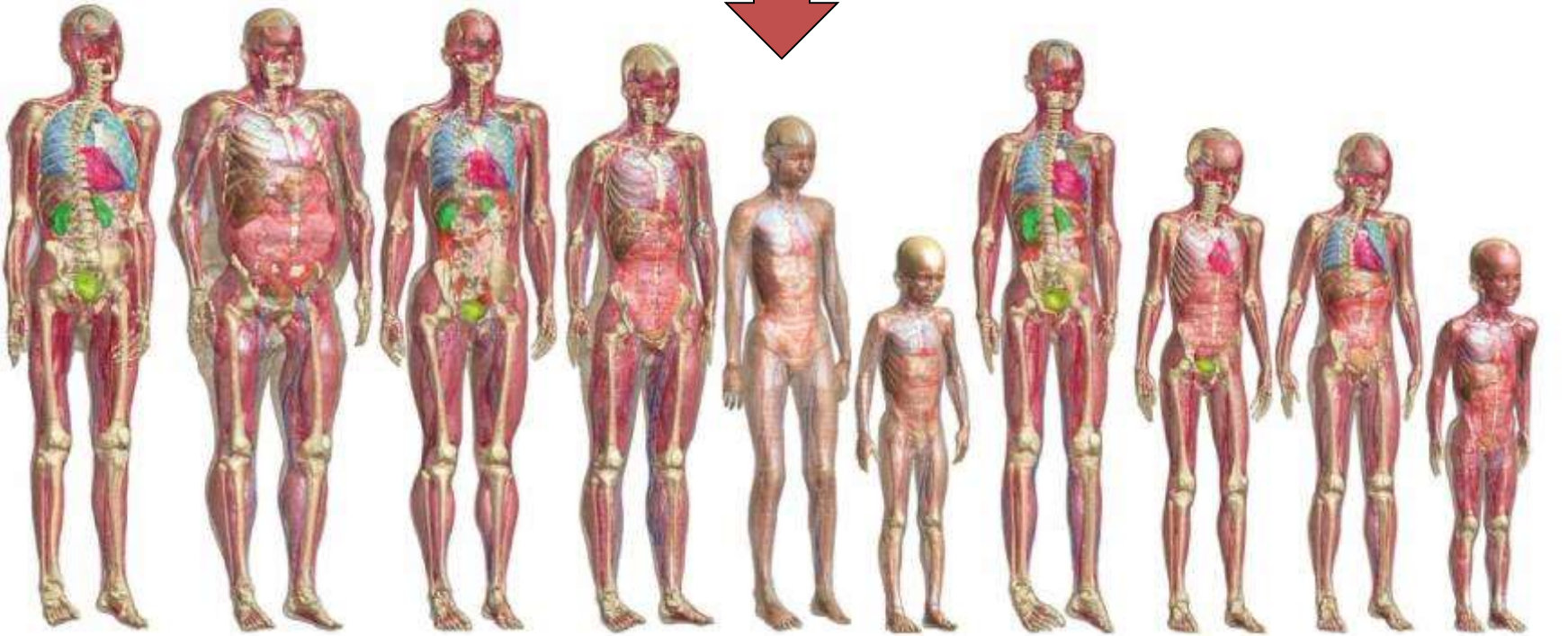
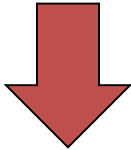


# Interesting components @ MICCAI 2017

- A full cross discipline dataset for classification
  - Automated patient contouring/organ segmentation
  - Instrument and procedure detection
  - Registered and normalized longitudinal data from  
imaging
-

# Data access, aggregation, simulation

Lab, Path., Rad.,  
Genetics



GLENN FATS DUKE ELLA BILLIE THELONIUS LOUIS DIZZY EARTHA ROBERTA

# Conclusions

- Regional hospital challenge: reduce short term focus, integrate in work-flow
- Quantification challenge: focus on IT-system integration and curation, AI/ML will come 😊
- Decision-making challenge: use imaging to visualize complex processes



