Next generation imaging

Bram Stieltjes, M.D., Ph.D.
Redefine the concept of impact
Academic vs Clinical reality

- 3-D Printing
- Budget cuts
- CNNs
- MD-Shortage
- OR 4.0
- Data avalanche
- VR
- Value-based medicine
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 + Coulter = 

- Callibrated
- Automated
- Quantified

Royal Society, 1673

US-Patent 2656608, 1953
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!

- PACS
- RIS
- HIS
- Search Engine
- Curation/Annotation
- Machine learning
- Decision support
- Research
- R&D
Create real problems

Re et al., RSNA 2016, ECR 2017
Aim for clinical integration

Mader et al., ECR 2017, Stieltjes et al., RSNA 2017
Laboratory radiology report

Computer-aided quantification pipeline

quantitative values

normative values
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

Murbach et al., MRM 2016
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