

# Poster M-01-250:

## Projection-based Motion Correction for Shifted-Detector Cone-Beam CT

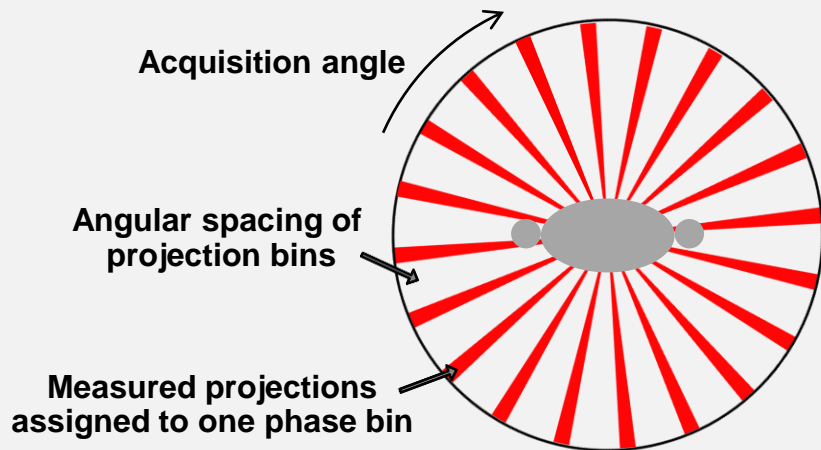
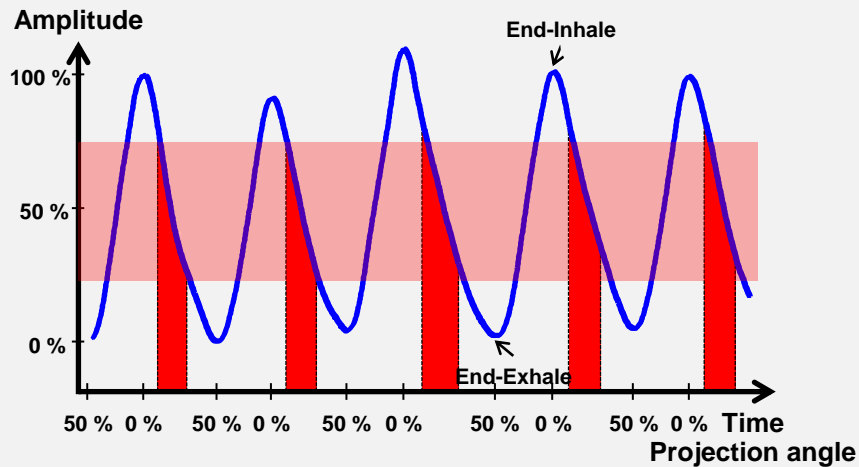
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and Marc Kachelrieß

<sup>1</sup>German Cancer Research Center (DKFZ), Heidelberg, Germany

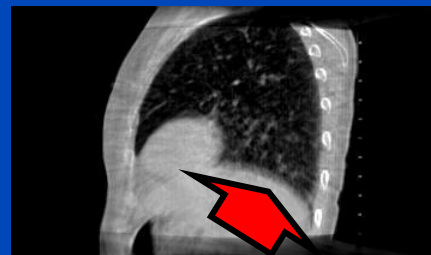
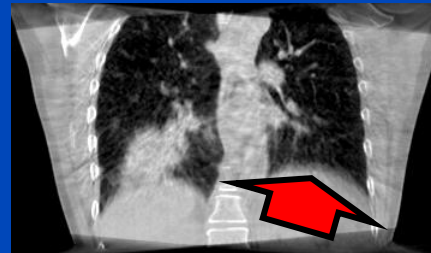
<sup>2</sup>Ruprecht-Karls-Universität, Heidelberg, Germany

<sup>3</sup>Varian Medical Systems Imaging Lab, Baden-Dättwil, Switzerland

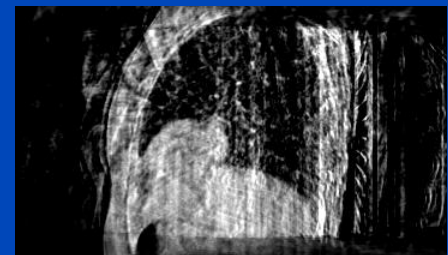
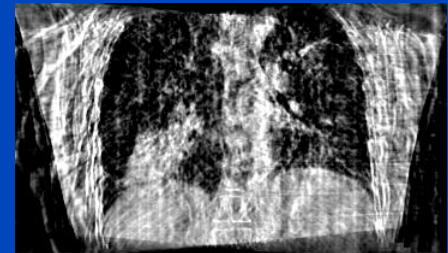
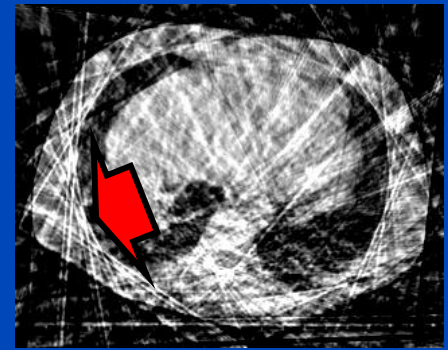
# Current Motion Compensation Approaches



Without gating (3D):  
Motion artifacts



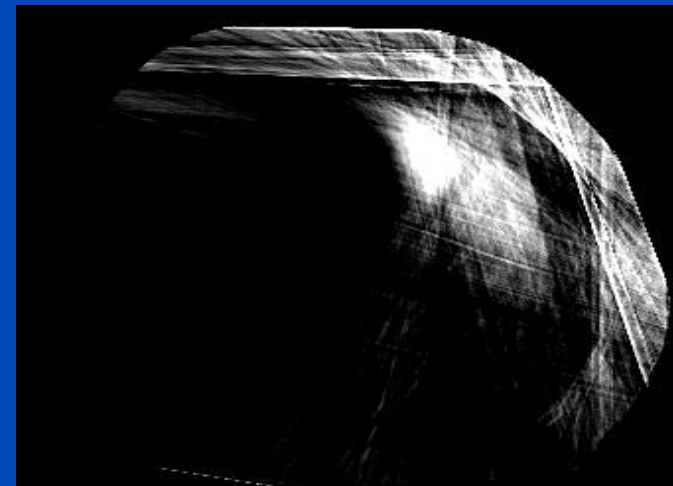
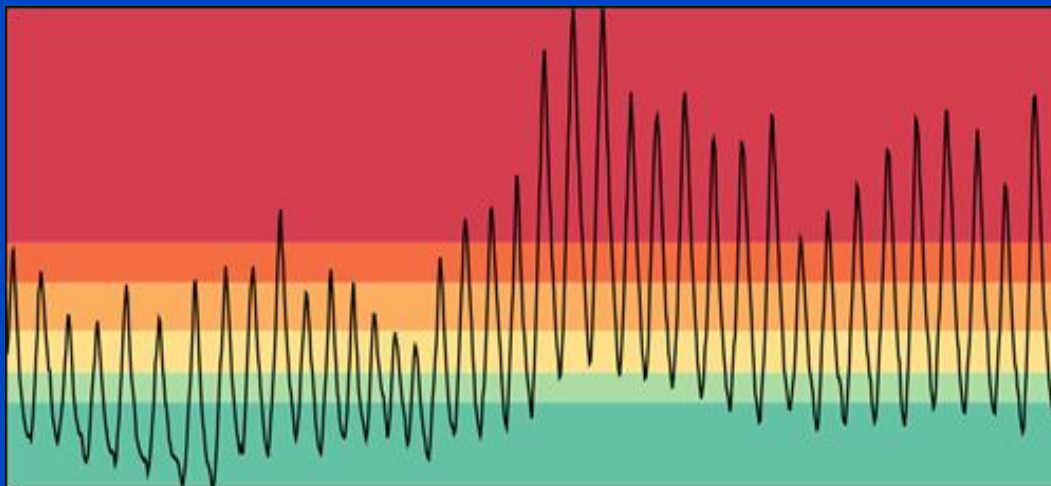
With gating (4D):  
Sparse-view artifacts



# Current Motion Compensation Approaches – Drawbacks

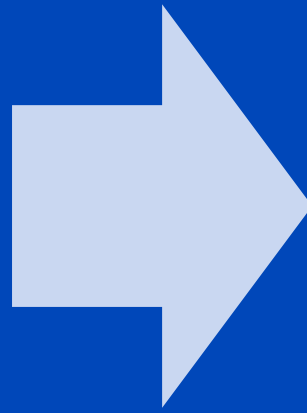
## Gating (and gating-based MoCo)

- requires gating signal,
- assumes periodic motion,
- has low temporal resolution,
- fails on irregular breathing:

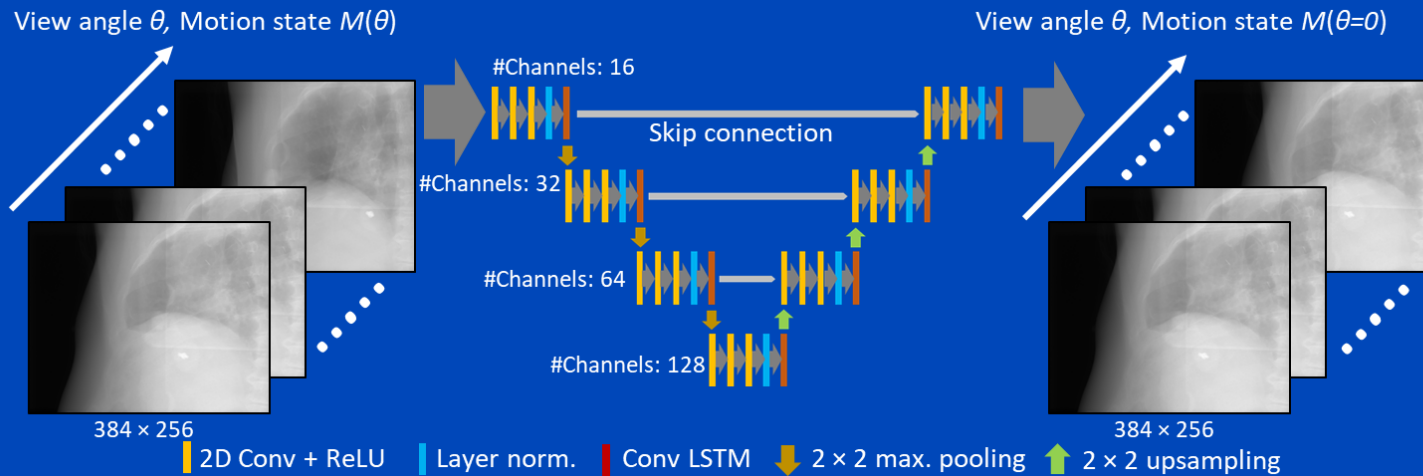


# Proposed Solution

Moving patient



Static patient



# Results – Simulated Projections

Moving patient  
(Input)

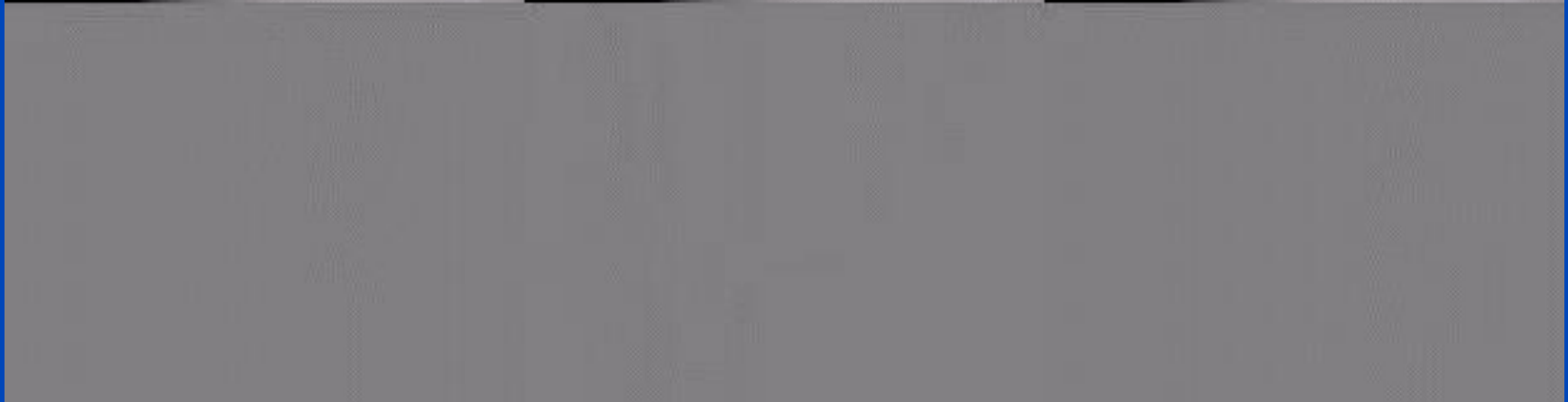
Network prediction

Static reference  
(GT)

X-ray projection



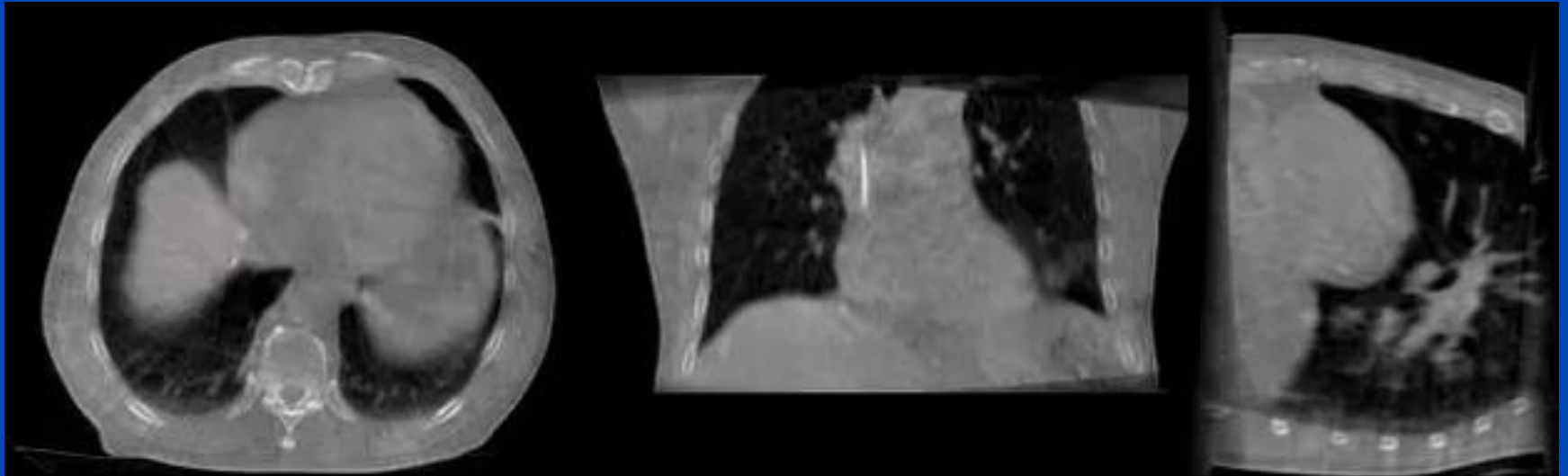
Difference to GT



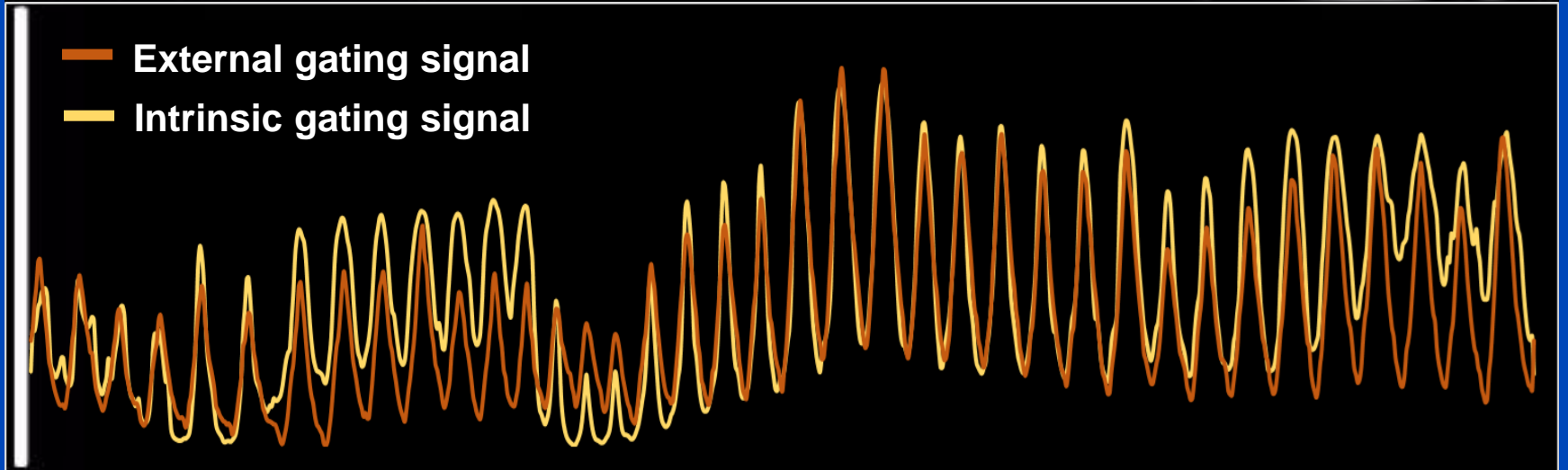


# Results: Varian CBCT Measurement

CT Reconstruction



External Resp. Signal



# Conclusions

- **Projection-based motion correction yields promising results for simulated and measured data (even though it is just trained on simulations).**
- **Good agreement with external respiration signal.**
- **May serve as an alternative to gating-based motion compensation approaches, particularly if no gating signal is available or motion is highly irregular.**

# Thank You!



The 8<sup>th</sup> International Conference on  
**Image Formation in X-Ray Computed Tomography**

August 5 – August 9, 2024, Bamberg, Germany  
[www.ct-meeting.org](http://www.ct-meeting.org)



Conference Chair

**Marc Kachelrieß**, German Cancer Research Center (DKFZ), Heidelberg, Germany

Job opportunities through DKFZ's international PhD programs or through [marc.kachelriess@dkfz.de](mailto:marc.kachelriess@dkfz.de).

Parts of the reconstruction software were provided by RayConStruct® GmbH, Nürnberg, Germany.