

# Deep Patient Motion Estimation: Pretraining, Overfitting, or Pretraining and Overfitting?

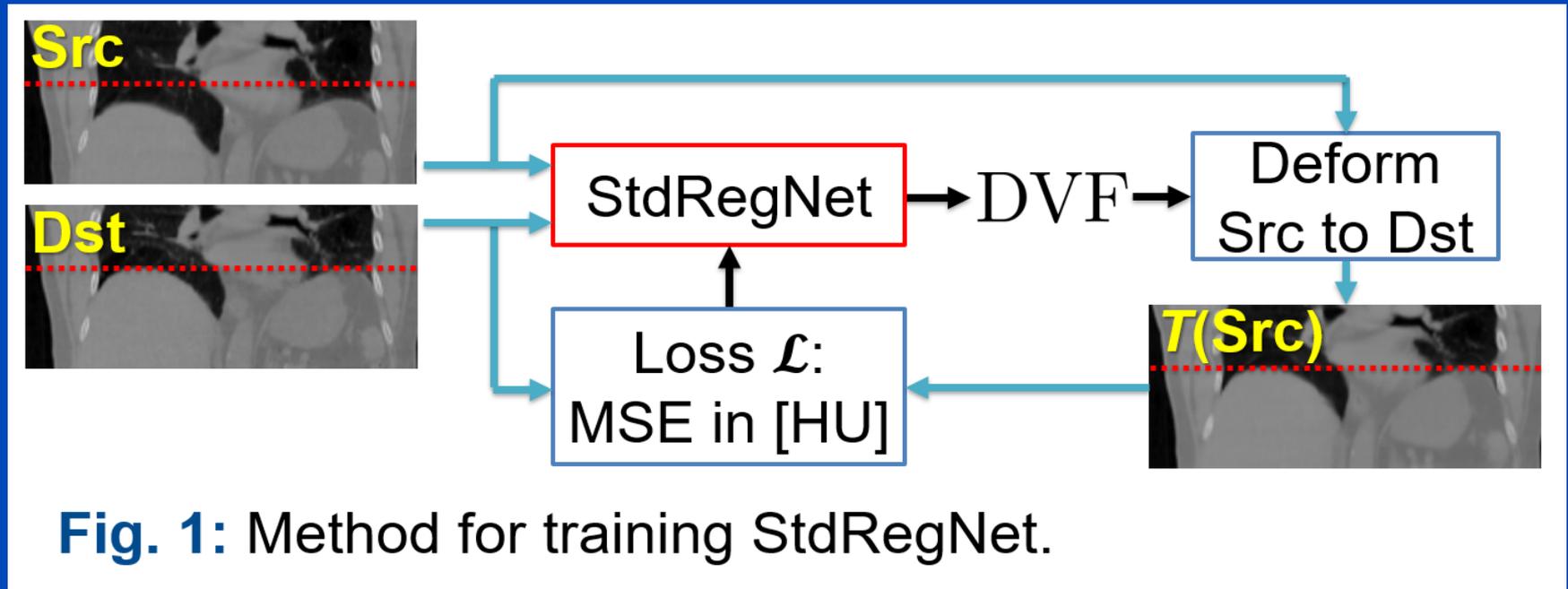
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# Network Design

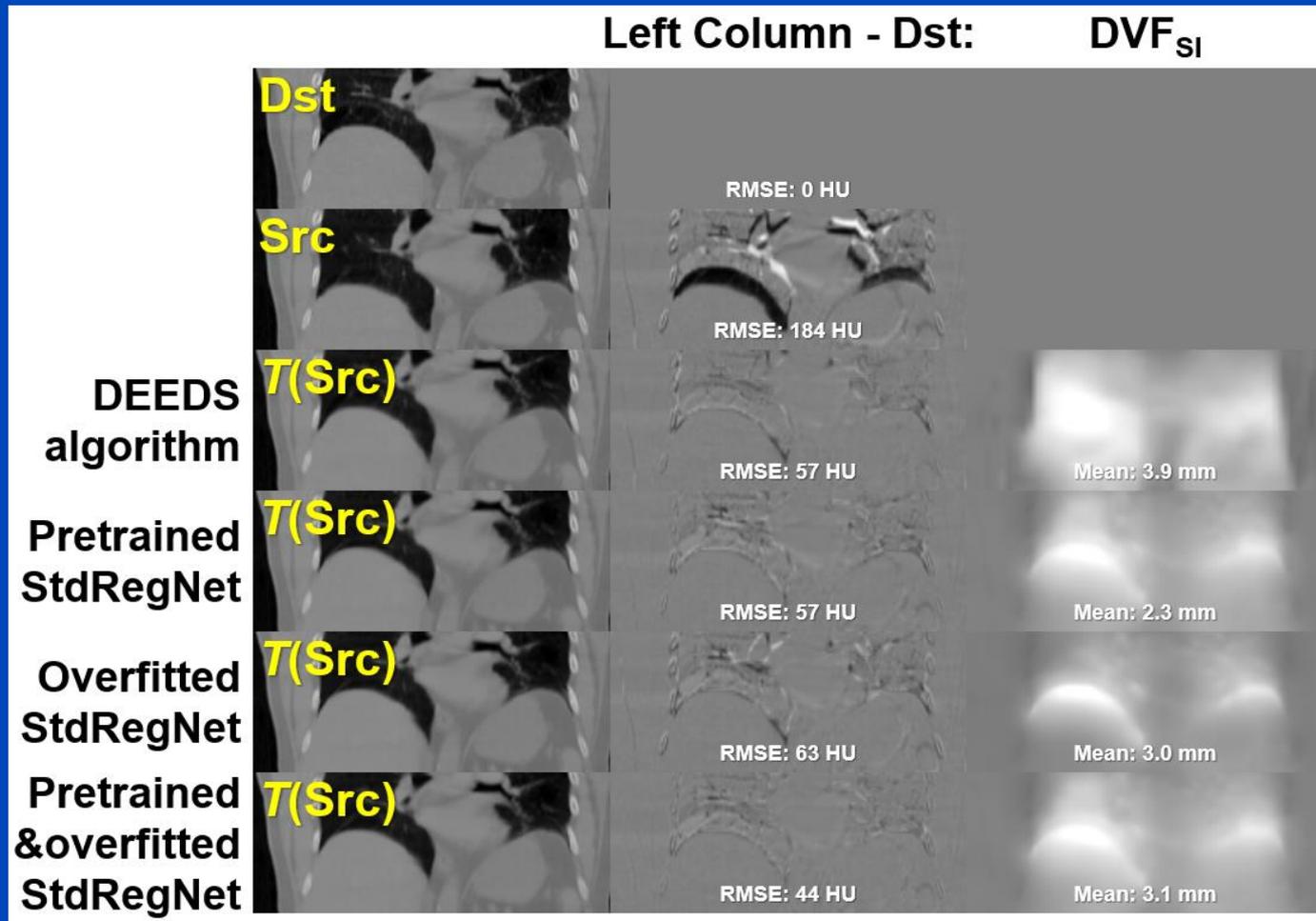


**Fig. 1:** Method for training StdRegNet.

$$\mathcal{L} = ||\text{Dst} - T(\text{Src})||_2^2 + \lambda^2 ||\nabla \text{DVF}||_2^2$$

with  $\lambda = 410$  HU

# Registration Result



DEEDS algorithm: M. P. Heinrich, et al., IEEE Transactions on Medical Imaging, vol. 32, no. 7, pp. 1239-1248, 2013.  
M. P. Heinrich, et al., ISBI, New York, NY, USA, 2015.

Left and middle:  $C = 0$  HU,  $W = 2000$  HU  
Right:  $C = 0$  mm,  $W = 40$  mm

# Conclusions

RMSE Difference of $T(\text{Src})$ with Dst using	DVF=0, $T(\text{Src})=\text{Src}$	DEEDS	Pretrained	Overfitted	Pretrained Overfitted
Patient Fig. 1	184 HU	57 HU	57 HU	63 HU	44 HU
Average over all test patients	$(134 \pm 20)$ HU	$(48 \pm 4)$ HU	$(41 \pm 6)$ HU	$(55 \pm 6)$ HU	$(35 \pm 4)$ HU

- While all described methods produce good results, the best results are achieved by a network that is first pretrained and then overfitted to estimate motion.

# Thank You!



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Conference Chair

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

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