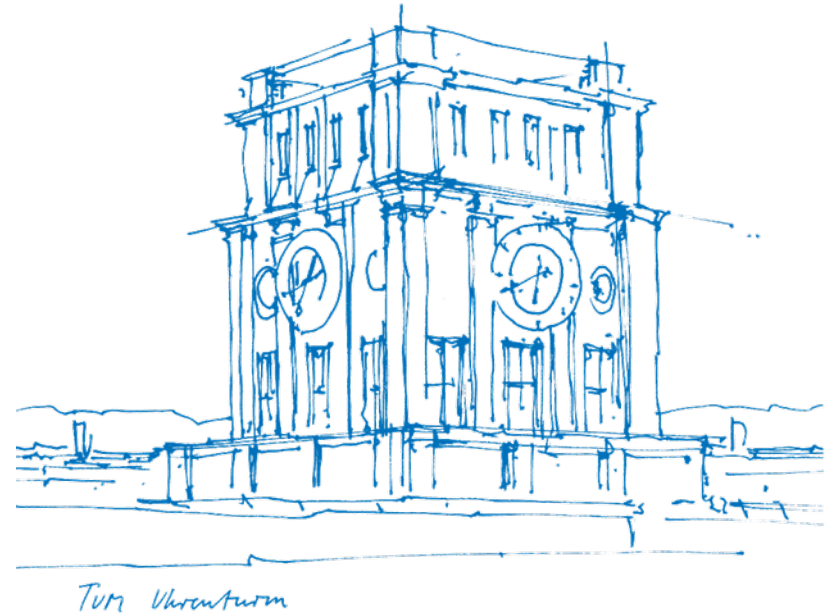


# Deep Learning Methods for Reynolds-Averaged Navier-Stokes Simulations of Airfoil Flows

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Chair of Computer Graphics and Visualization  
Munich, 11. May 2020



# Introduction

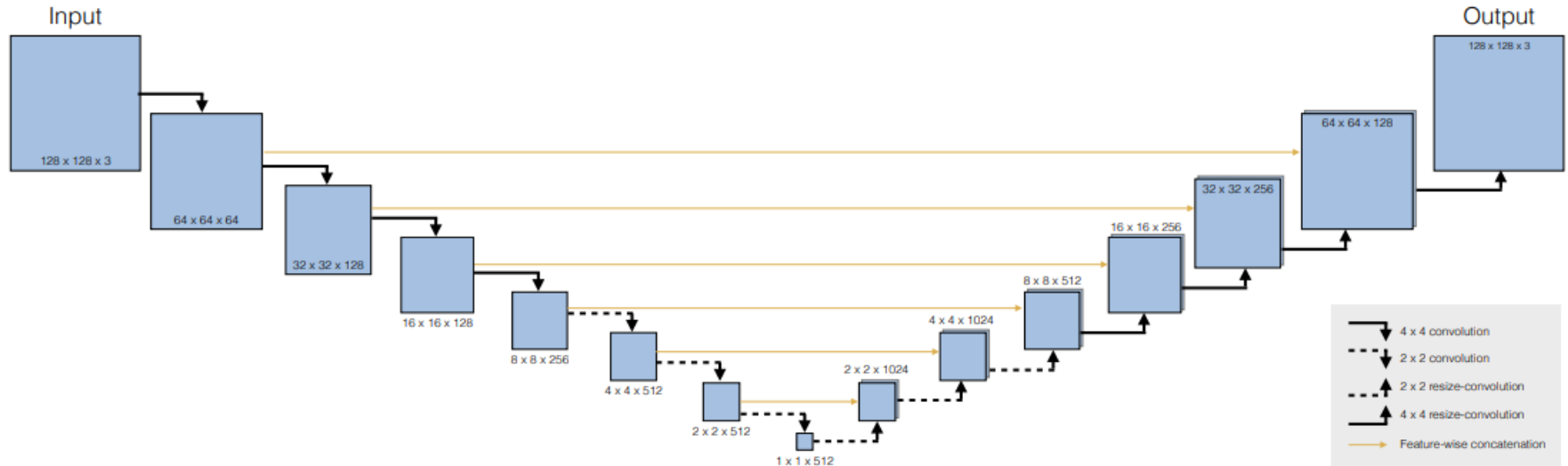
TODO

# Background

TODO

# Architecture

U-Net derivative proposed in the paper:



Taken from <https://arxiv.org/pdf/1810.08217.pdf>

# Architecture

Convolutional blocks:

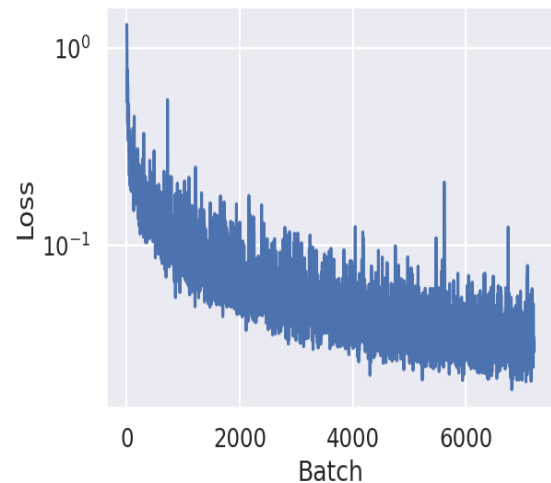
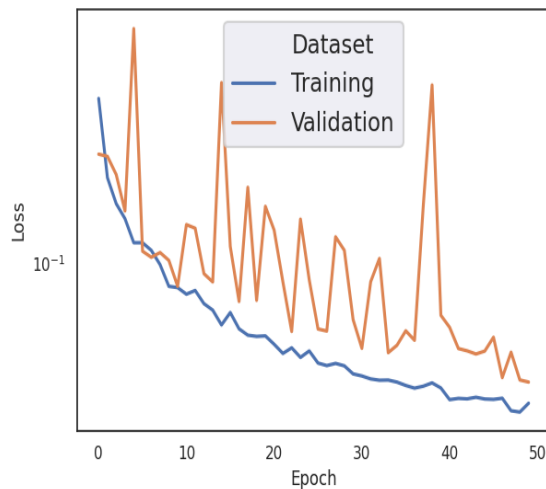
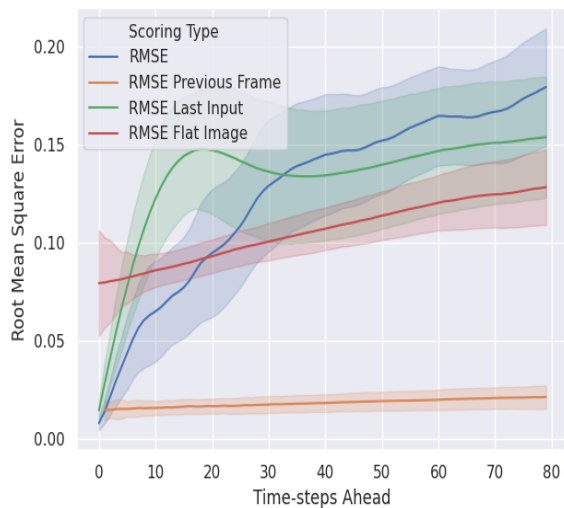
TODO

# Pre-processing

TODO

# Transfer

RMSE with variance, validation loss and batch loss on Bigger Tub environment:

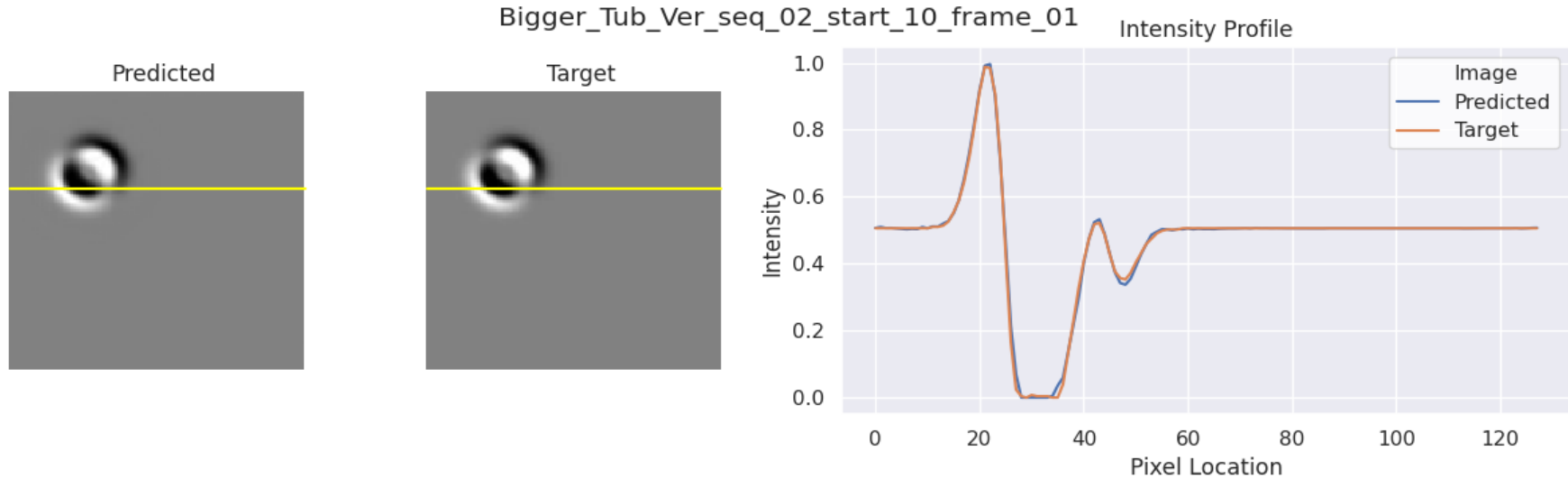


All plots in Transfer were made with [https://github.com/stathius/wave\\_propagation](https://github.com/stathius/wave_propagation)

# Transfer

Wave propagation prediction

Intensity profile on scanline – Frame 1

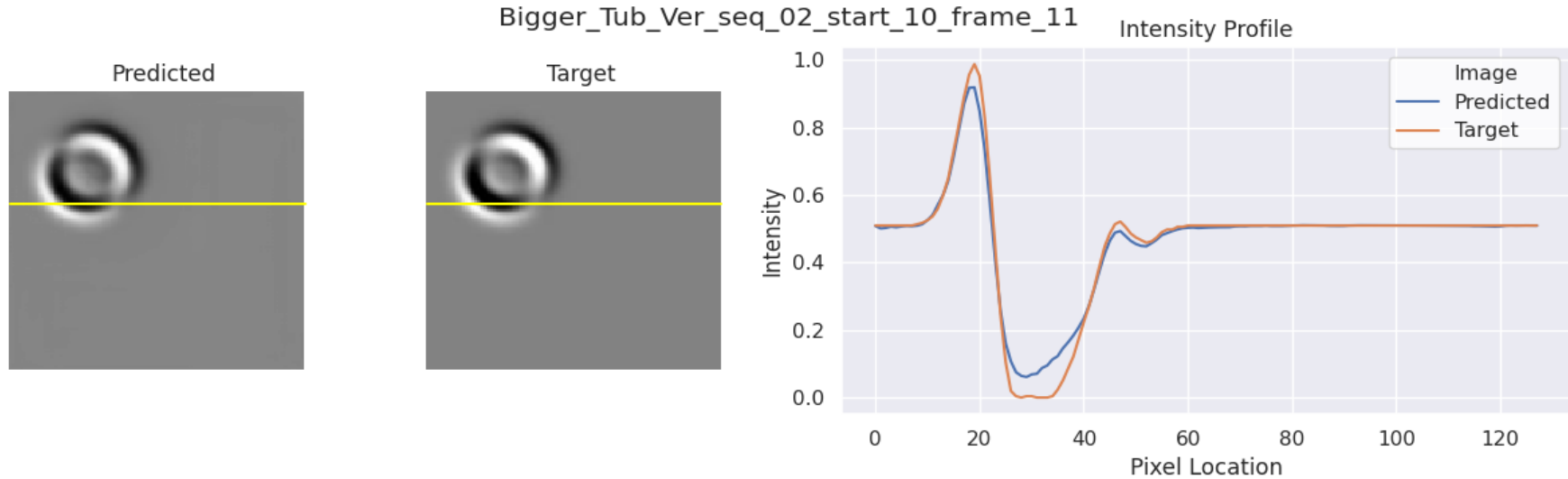




# Transfer

Wave propagation prediction

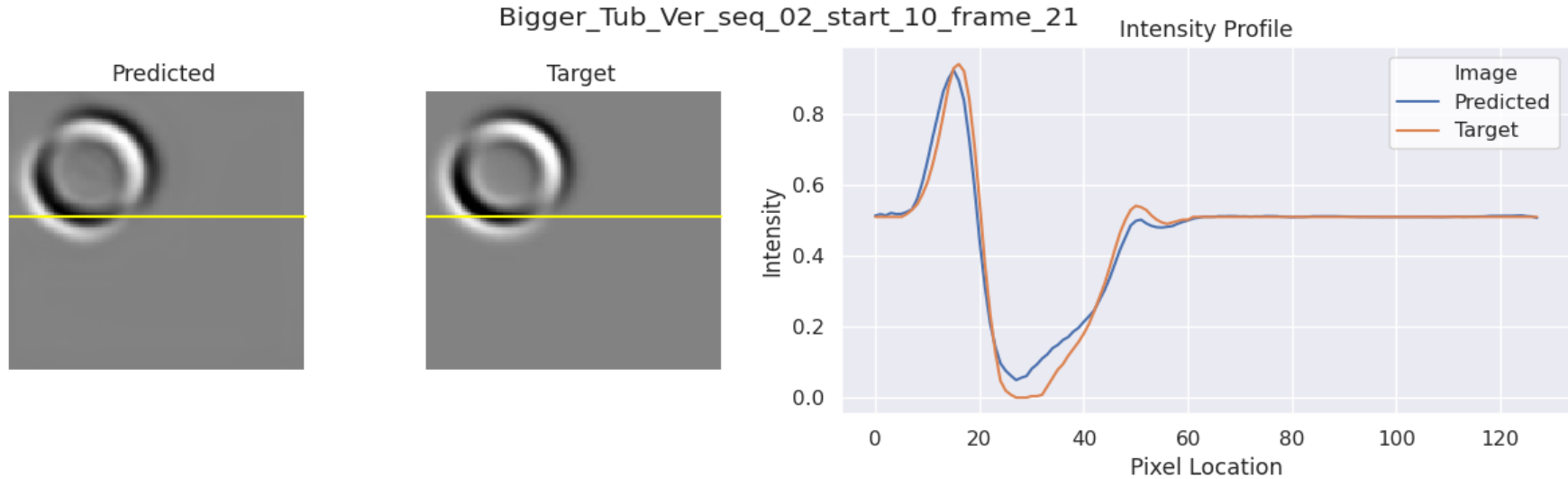
Intensity profile on scanline – Frame 11



# Transfer

Wave propagation prediction

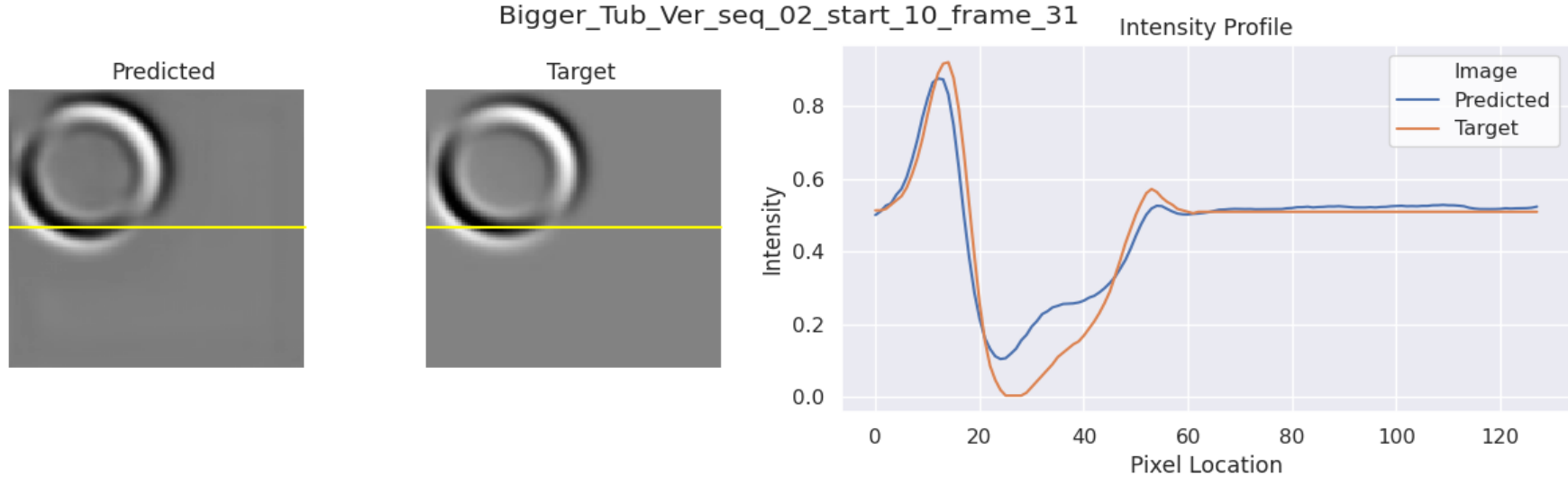
Intensity profile on scanline – Frame 21



# Transfer

Wave propagation prediction

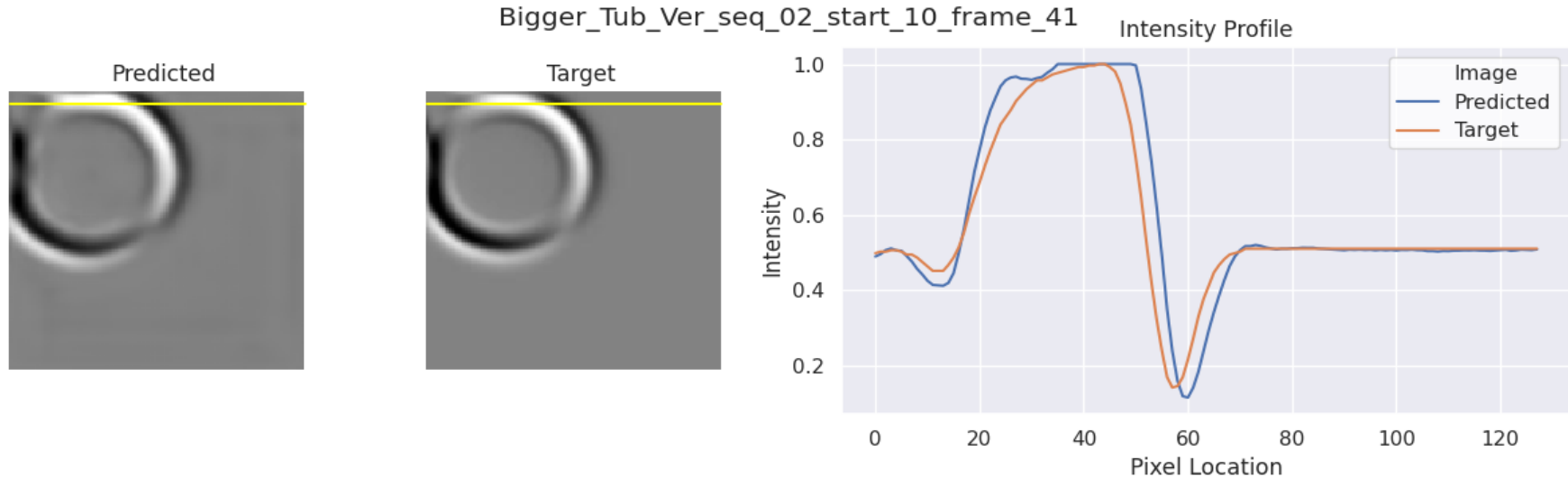
Intensity profile on scanline – Frame 31



# Transfer

Wave propagation prediction

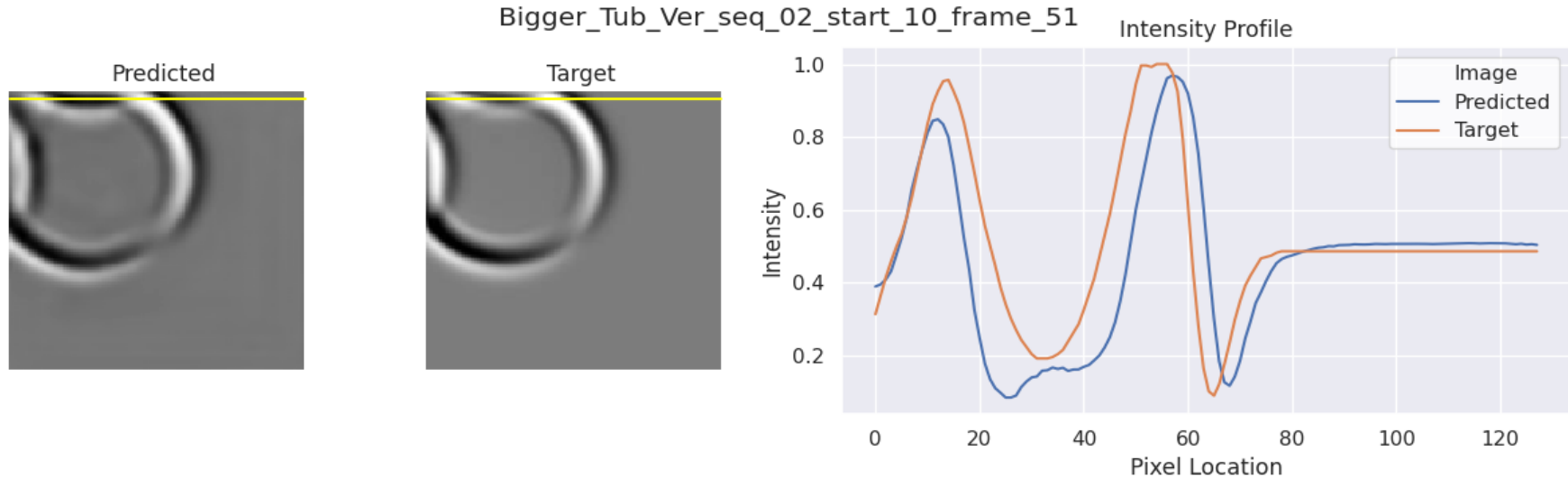
Intensity profile on scanline – Frame 41



# Transfer

Wave propagation prediction

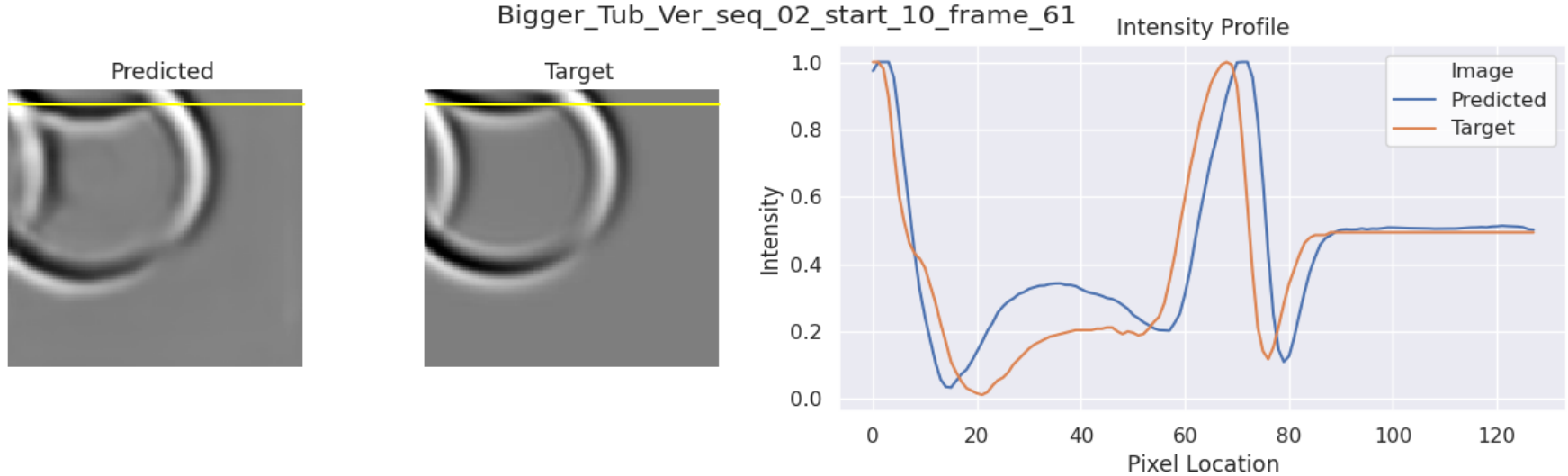
Intensity profile on scanline – Frame 51



# Transfer

Wave propagation prediction

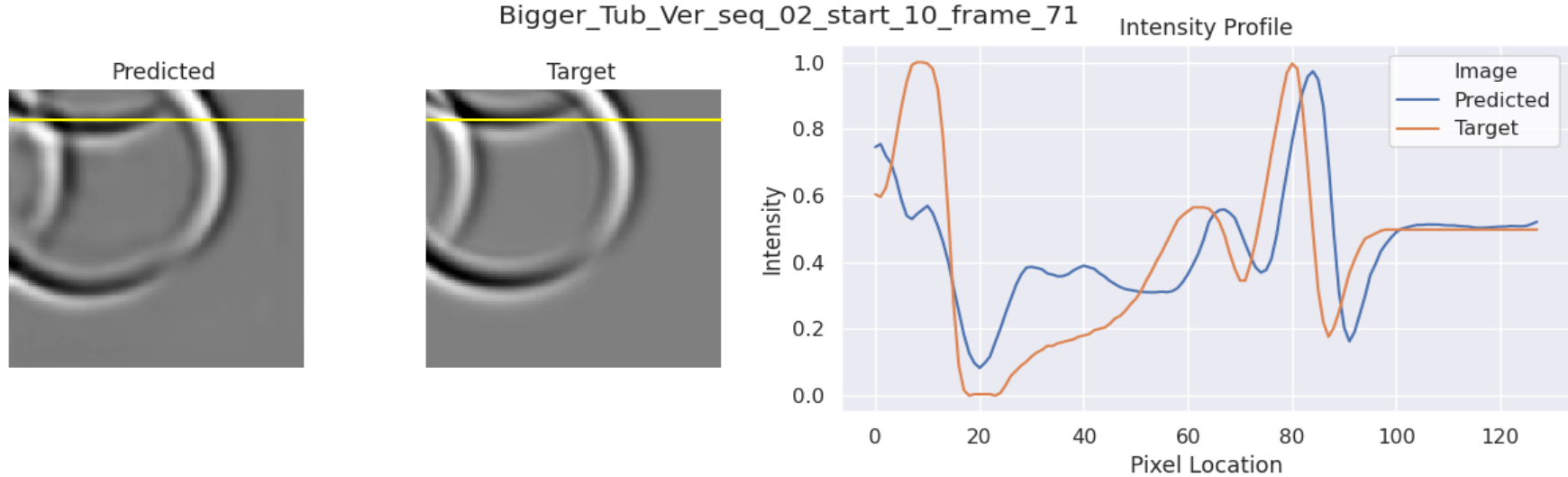
Intensity profile on scanline – Frame 61



# Transfer

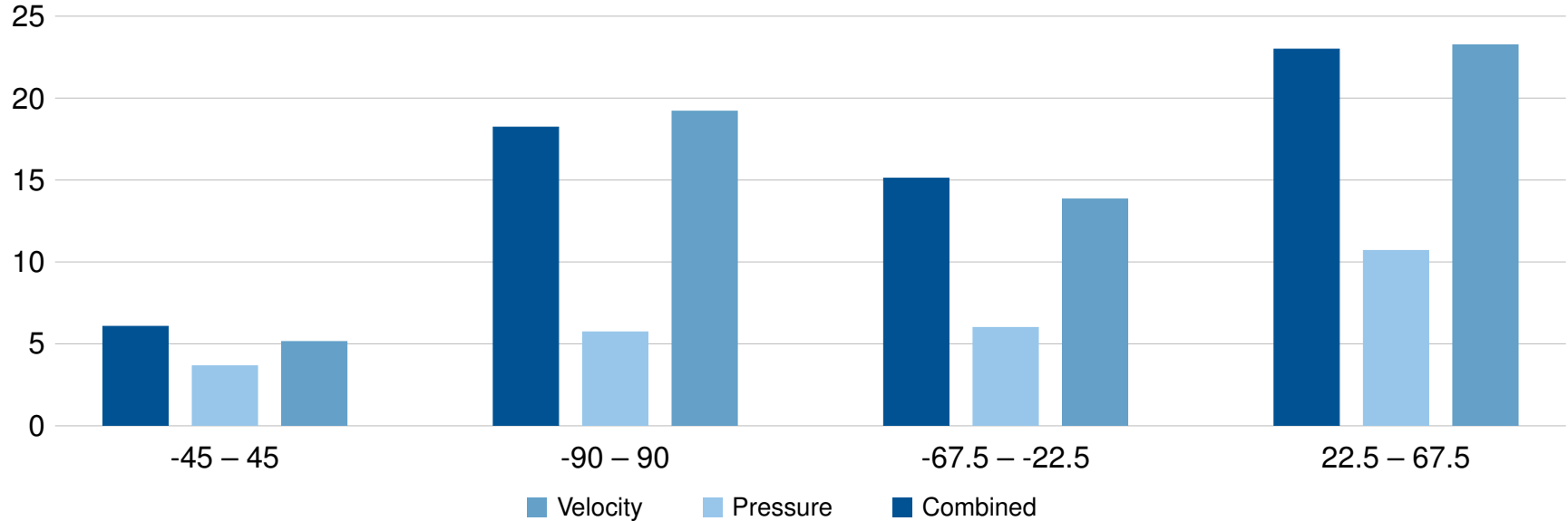
Wave propagation prediction

Intensity profile on scanline – Frame 71



# Generalization

Error percentage of different angle of attack intervals wrt. ground truth  $[-22.5, 22.5]$





# Discussion

TODO