

Synthetic magnetic resonance images to support quantitative fetal brain analysis

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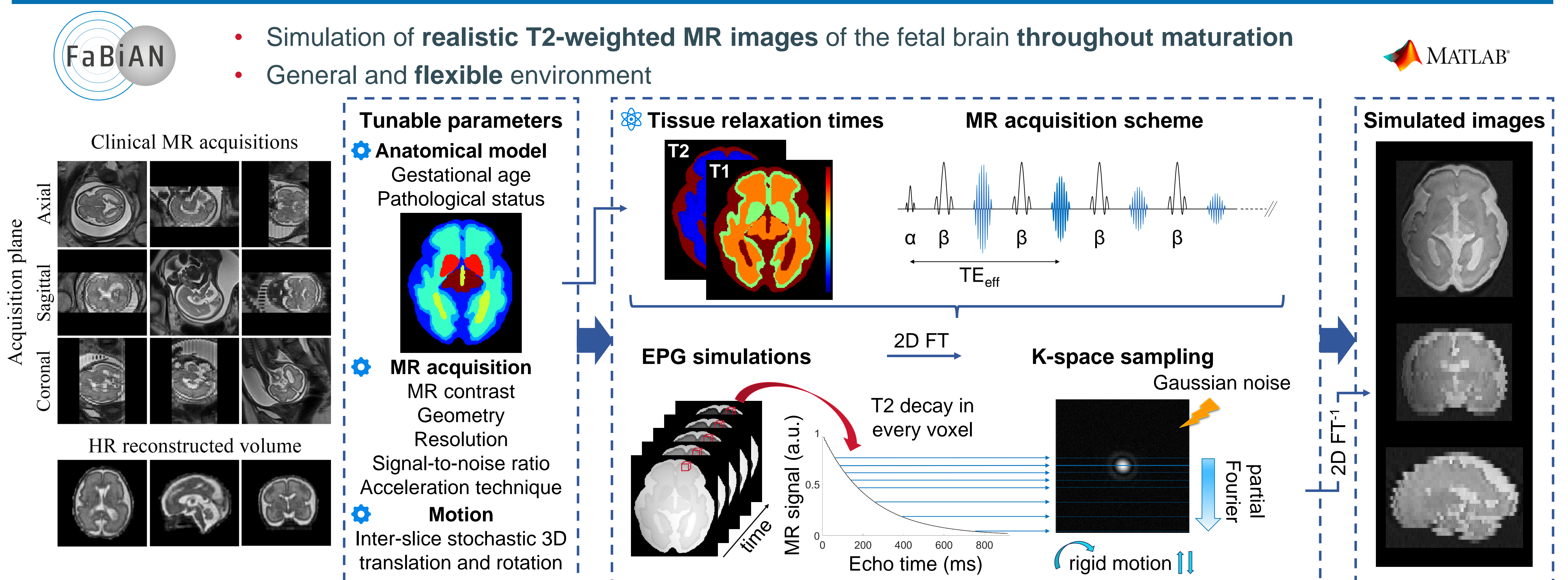
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Background & Motivation

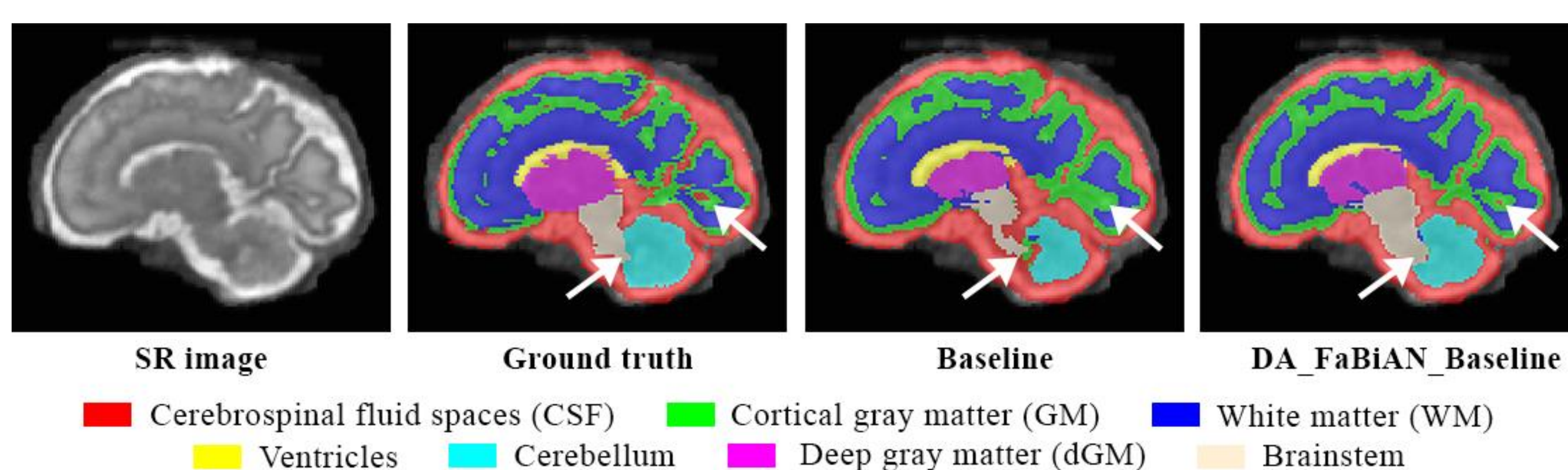
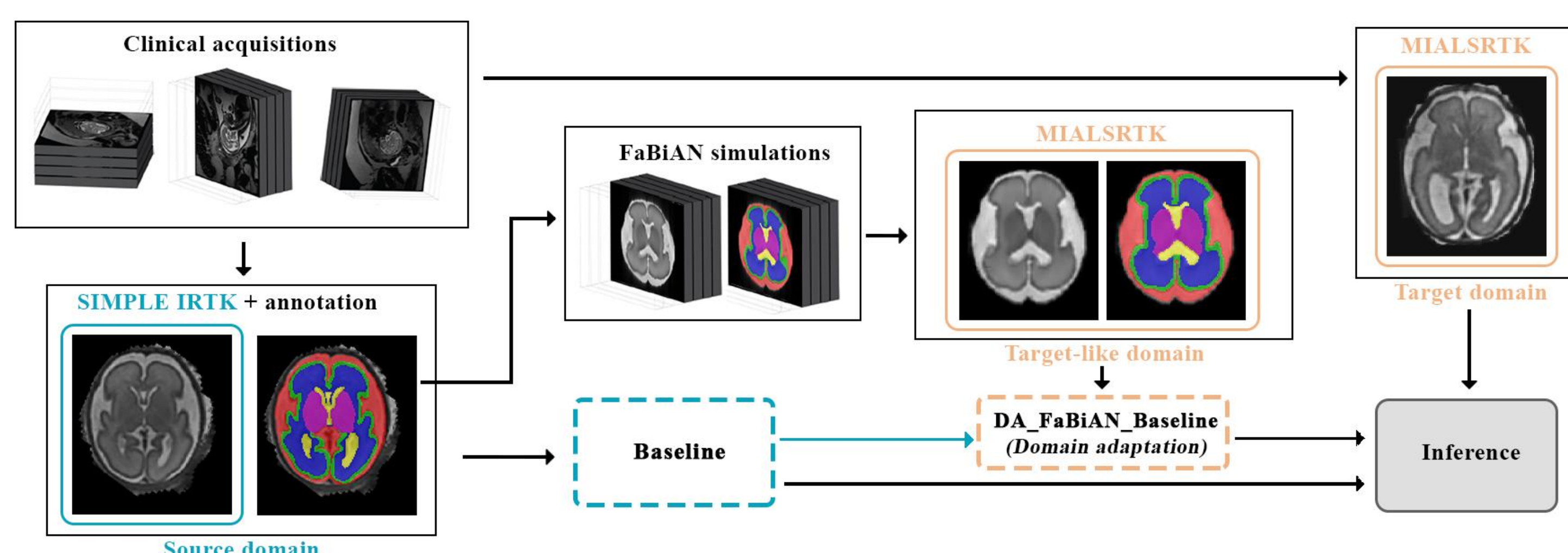
- Magnetic resonance imaging (MRI) is a key technique for the **early diagnosis** of fetal brain abnormalities.
- Orthogonal T2-weighted series of 2D thick slices are acquired.
- Super-resolution (SR) techniques**¹ allow to reconstruct an isotropic high-resolution (HR) 3D volume of the fetal brain.
- Challenges for the development of **automated and generalized** post-processing methods:
 - scarcity** of exploitable data
 - domain gaps** between MR scanners and reconstruction techniques

FaBIAN, a Fetal Brain magnetic resonance Acquisition Numerical phantom^{2,3}



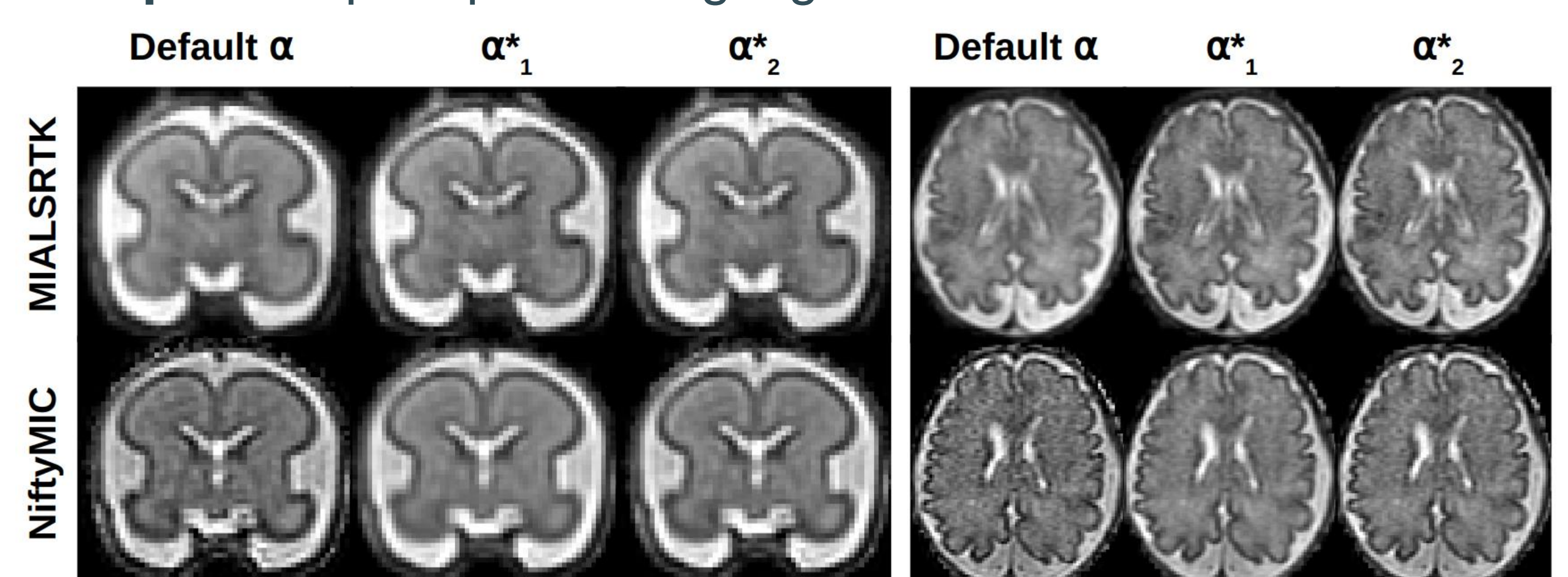
Application 1: Domain adaptation for tissue segmentation⁴

- Support **data augmentation** strategies
- Bridge the **domain gap** between different datasets
- ↑ accuracy of **fetal brain tissue segmentation**



Application 2: SR optimization⁵

- Simulate 3D high-resolution **ground truth** images
- Optimize** post-processing algorithms



Application 3: Evaluation of new T2 mapping strategies

- Realistic model** in a motion-controlled environment

