



清華大學
Tsinghua University



Pervasive Human Computer Interaction
Department of Computer Science and Technology
Tsinghua University

PoseAugment

**Generative Human Pose Data Augmentation with Physical Plausibility
for IMU-based Motion Capture**

Zhuojun Li, Chun Yu*, Chen Liang, Yuanchun Shi

Pervasive Human-Computer Interaction Laboratory

Tsinghua University, Beijing, China



 Analytics Insight



XNect

DIP [TOG 2018]

- Top Measurement
- Heading Reset
- giz Model Inference
- giz Acceleration
- Dr Bone Orientations
- Set I-Pose
- Dump Recording

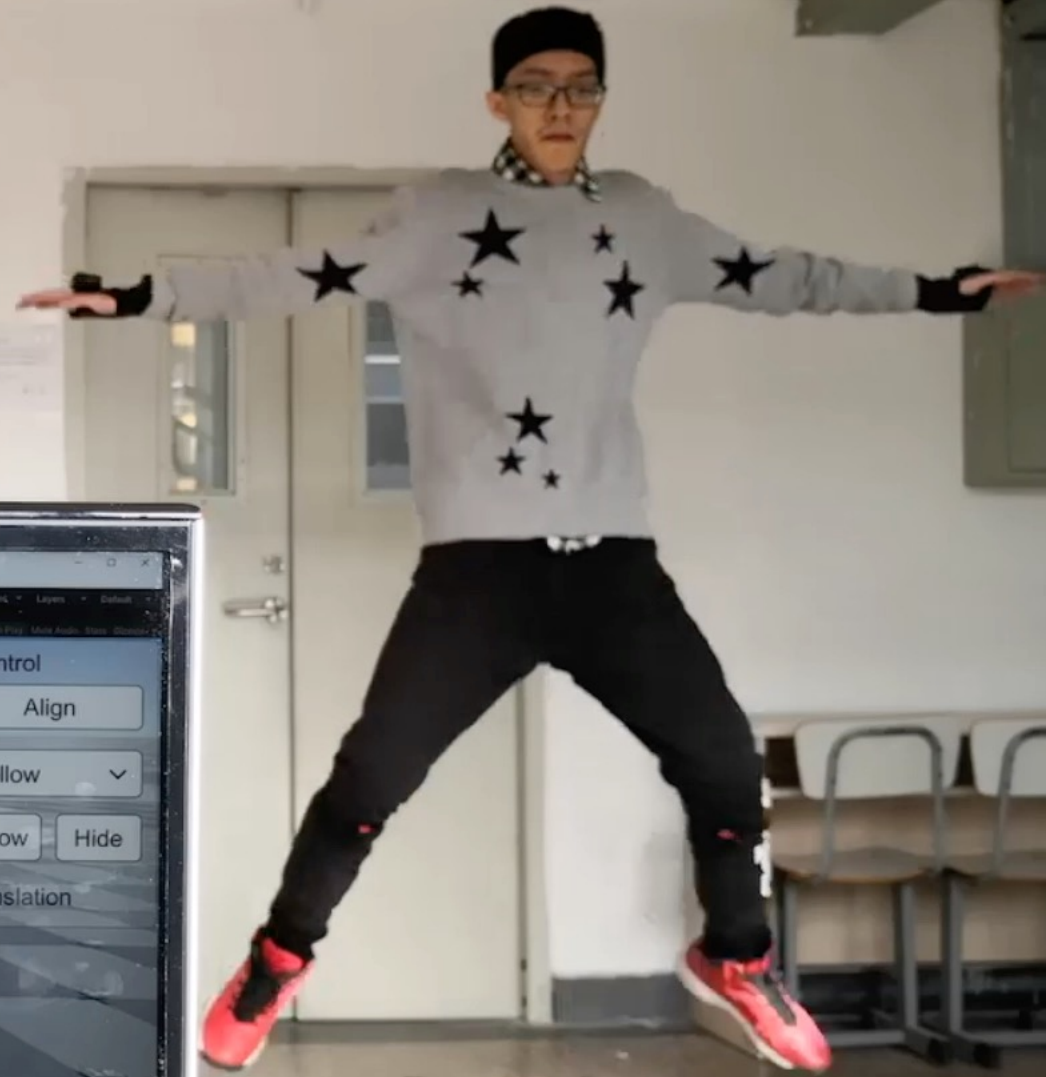
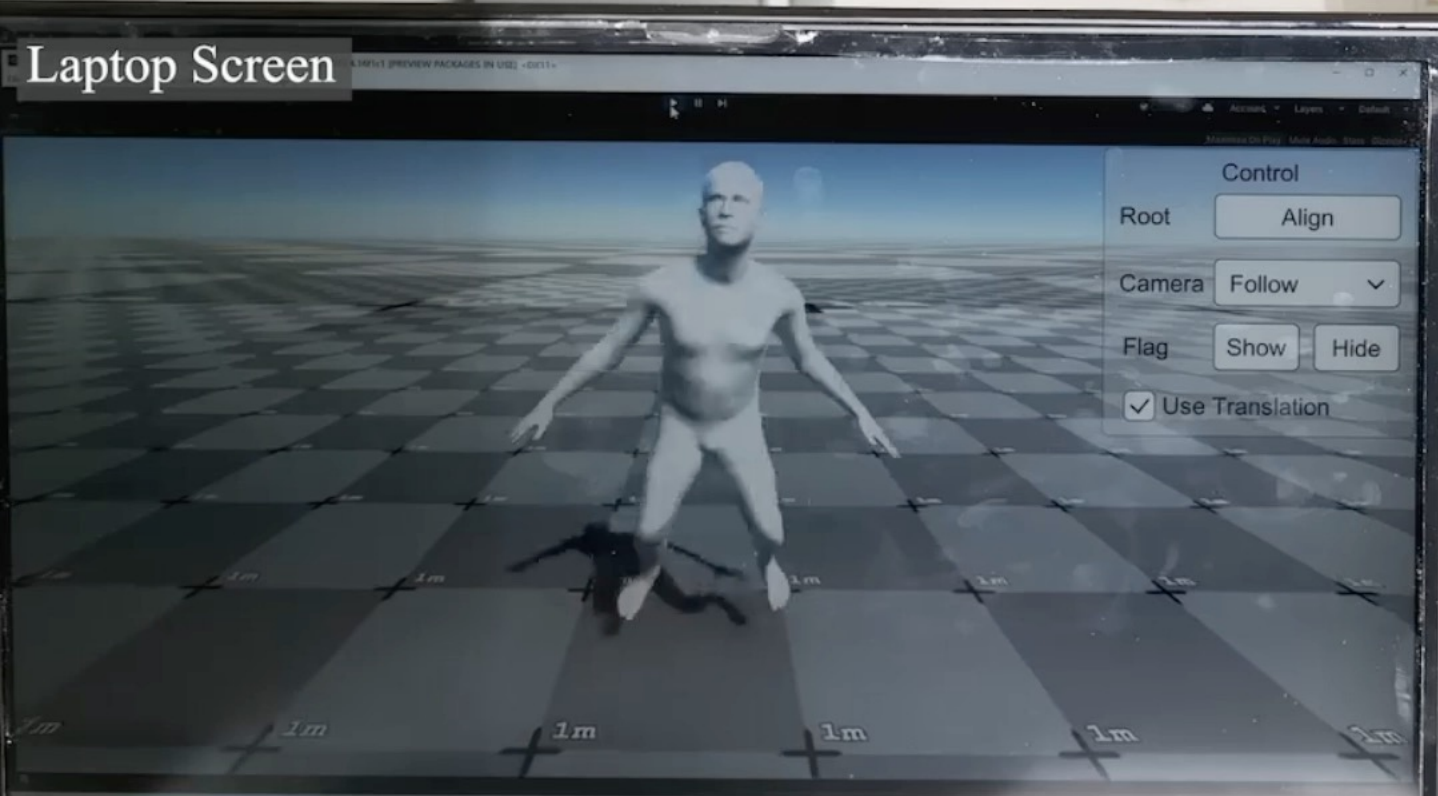
Speaker icon 25



Live Demo: Jump

TransPose
[TOG 2021]

Laptop Screen

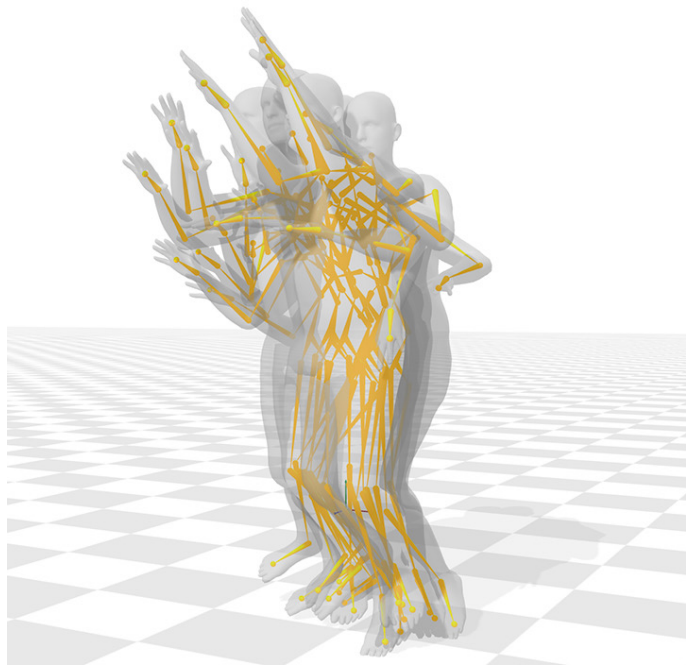


IMUPoser [CHI 2023]

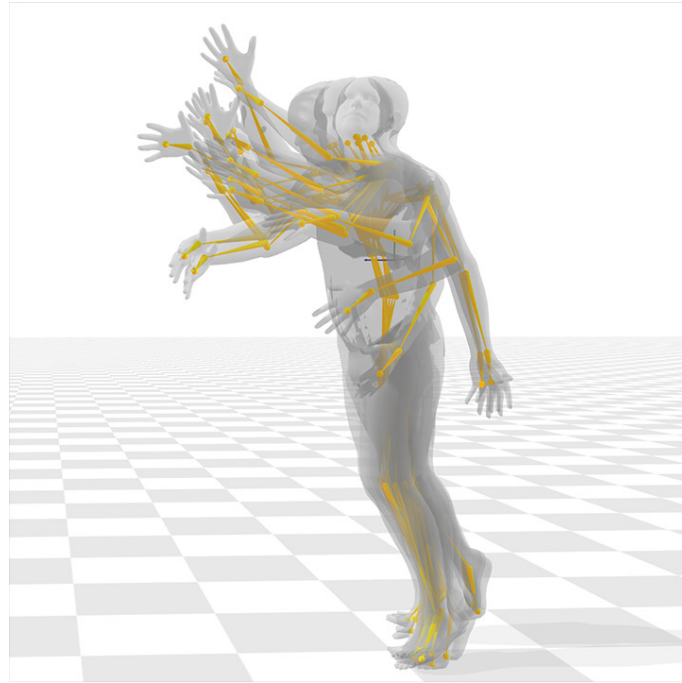


OptiTrack

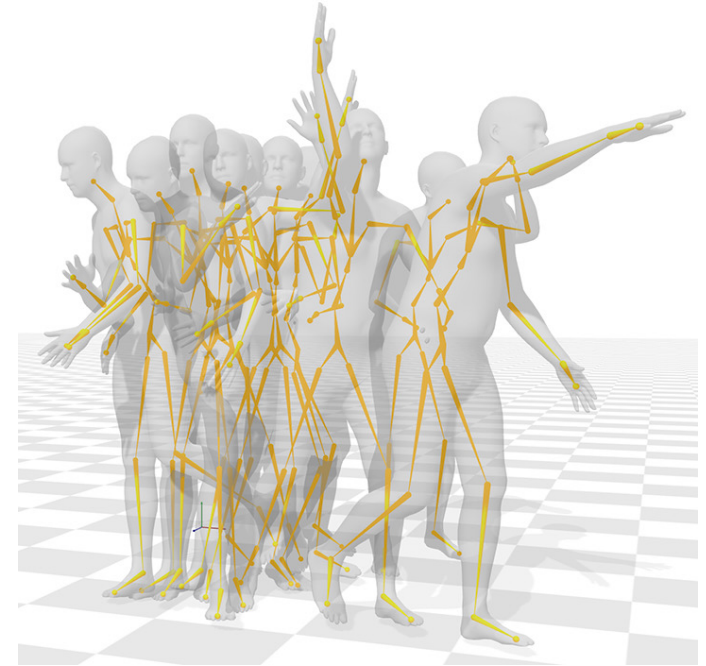




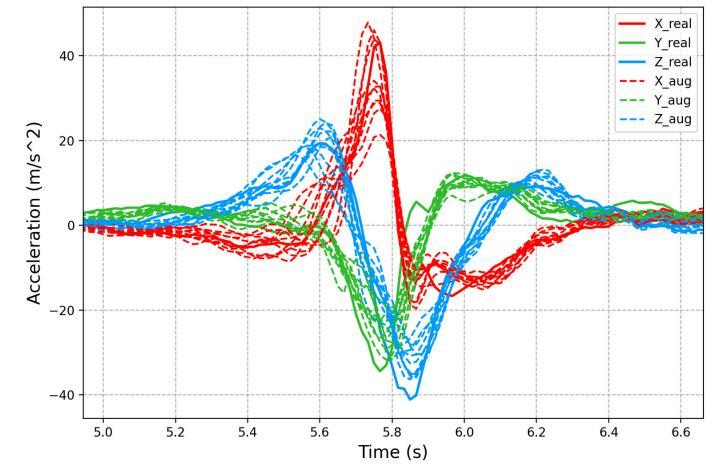
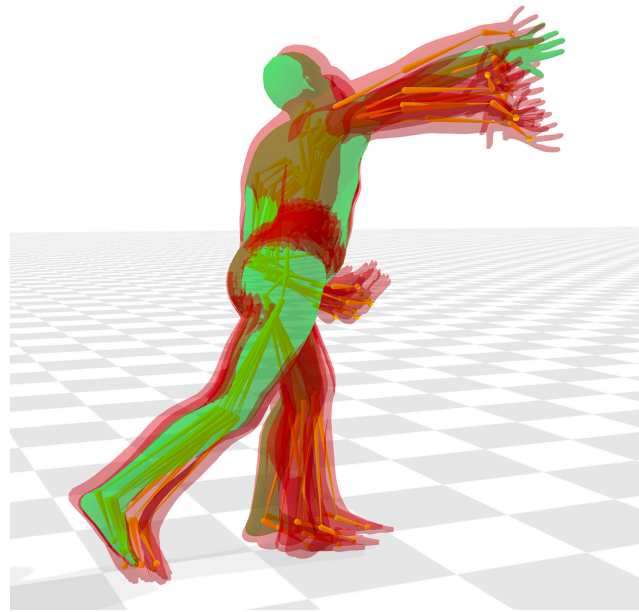
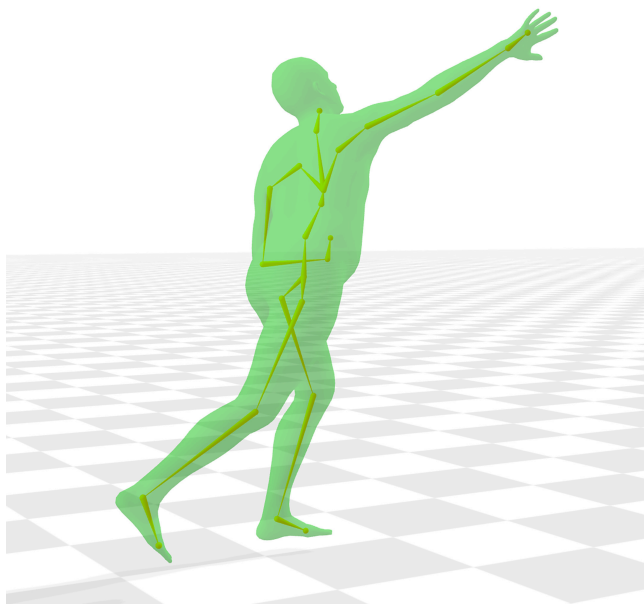
MotionAug

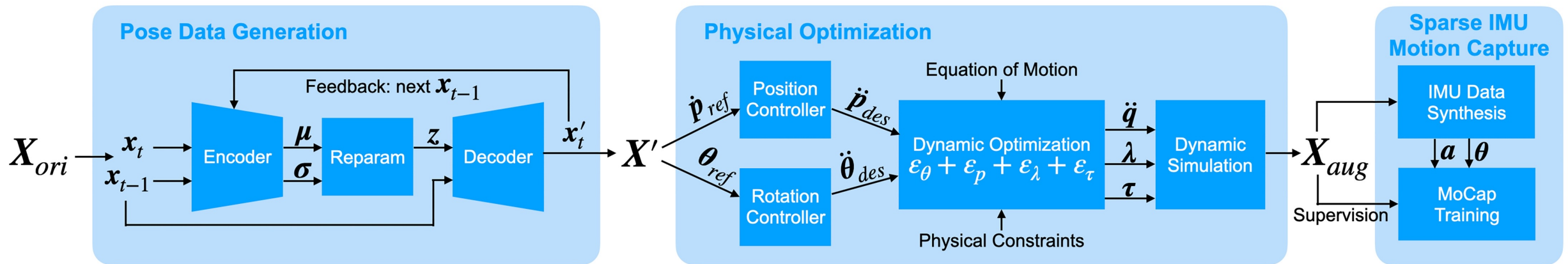


ACTOR

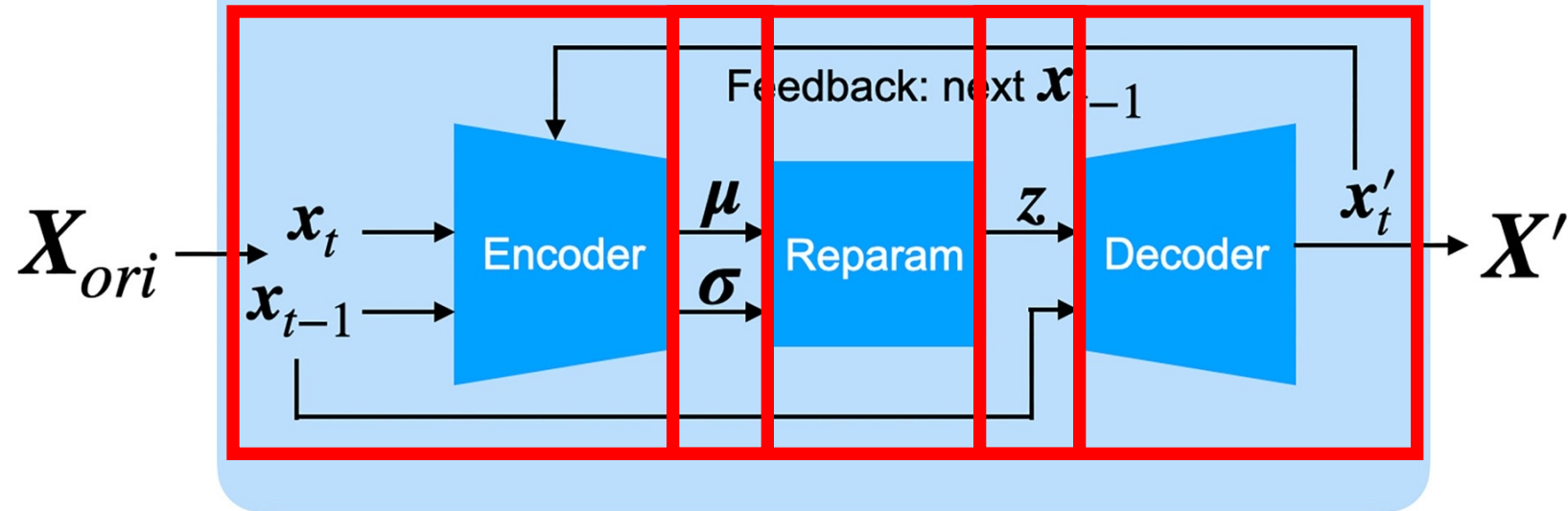


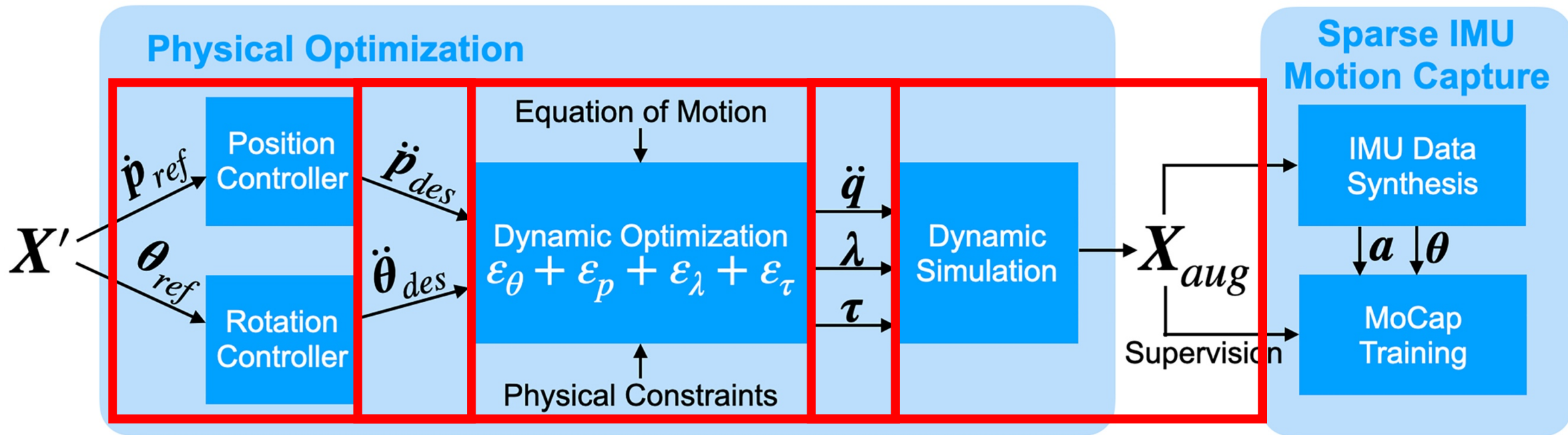
MDM





Pose Data Generation

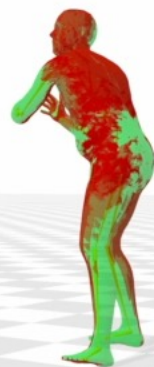




Walking



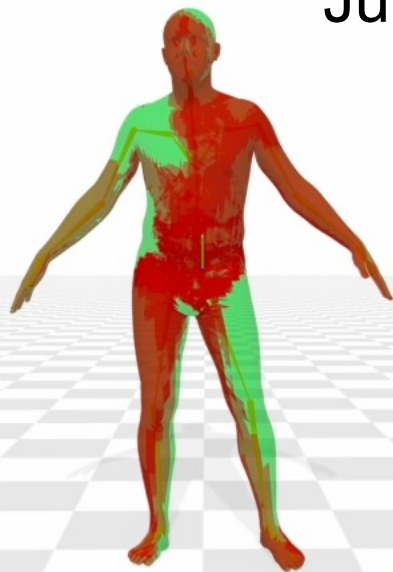
Throwing



Climbing Stairs



Jumping

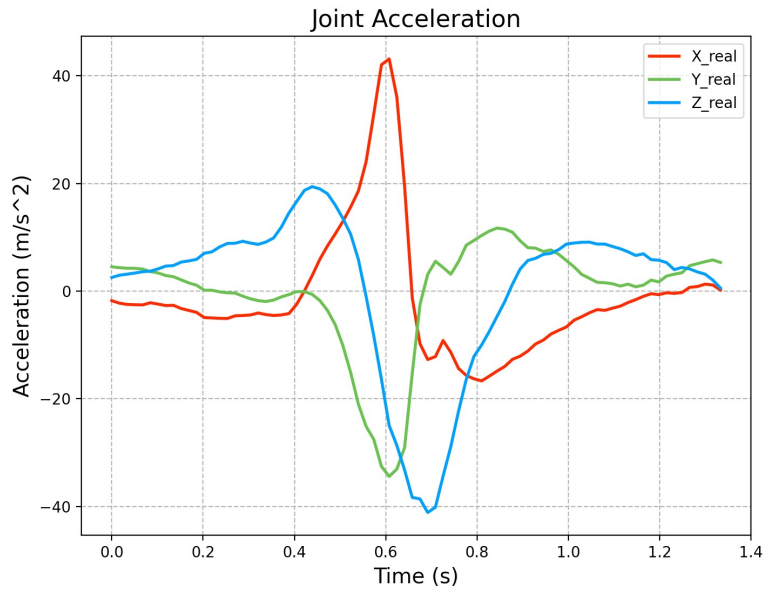


Crouching

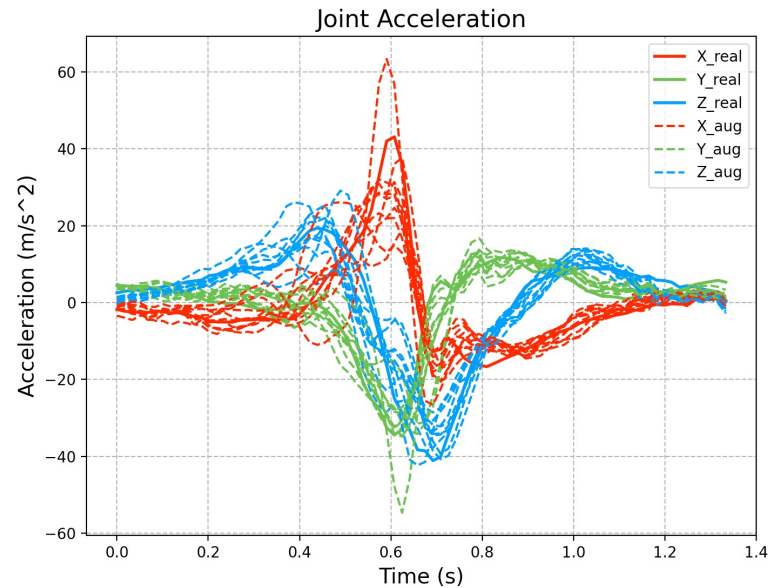


Martial Arts

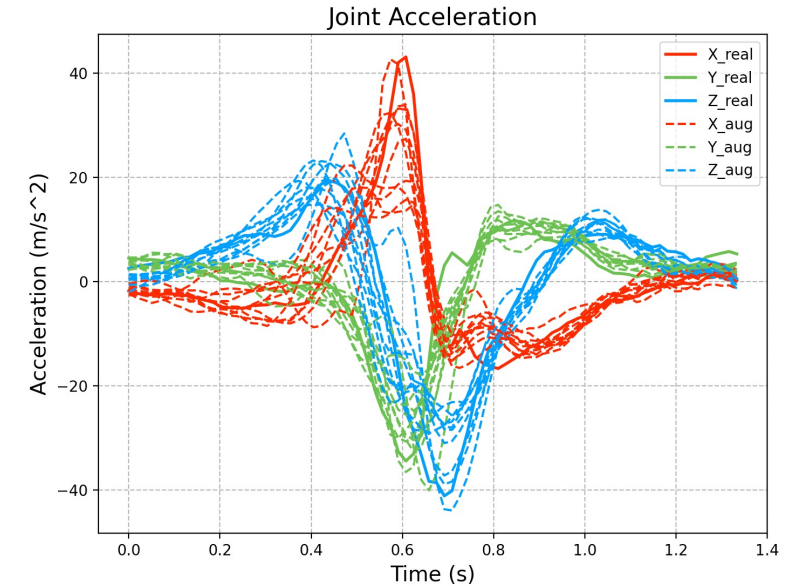




From **Original Pose**
 Jitter = 2.11 (100m/s³)



From **Generated Poses**
 Jitter = 5.15 (100m/s³)



From **Optimized Poses**
 Jitter = 2.32 (100m/s³)

Method	$e_{SIP}(\circ)$	$e_{rot}(\circ)$	$e_{pos}(cm)$	$e_{mesh}(cm)$	Method	$e_{SIP}(\circ)$	$e_{rot}(\circ)$	$e_{pos}(cm)$	$e_{mesh}(cm)$
NoAug	36.38	17.12	11.07	12.42	NoAug	26.20	11.77	7.40	8.53
Jitter	-2.2%	-3.0%	-4.9%	-4.2%	Jitter	-1.2%	0.2%	0.7%	0.3%
MotionAug	-5.4%	-13.5%	-5.7%	-6.7%	MDM-M2M	-0.5%	-0.7%	-0.1%	-0.2%
Ours	-14.5%	-9.8%	-8.0%	-5.4%	Ours	-7.6%	-9.1%	-7.8%	-8.6%
NoAug	30.64	16.84	8.62	9.97	NoAug	25.76	11.77	7.23	8.37
Jitter	-2.0%	-1.5%	+0.7%	+0.4%	Jitter	1.4%	-0.7%	+1.0%	+0.2%
ACTOR	-2.7%	-4.9%	-2.6%	-2.1%	MDM-T2M	-1.0%	-2.5%	+0.9%	+0.3%
Ours	-17.4%	-20.7%	-10.7%	-12.2%	Ours	-4.3%	-8.3%	-5.8%	-6.8%

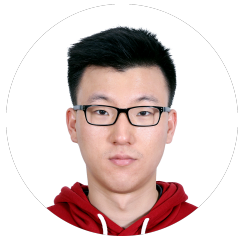
Comparisons of our method with Jitter, MotionAug, ACTOR, MDM-M2M, and MDM-T2M.



清华大学
Tsinghua University



Pervasive Human Computer Interaction
Department of Computer Science and Technology
Tsinghua University



Zhuojun Li



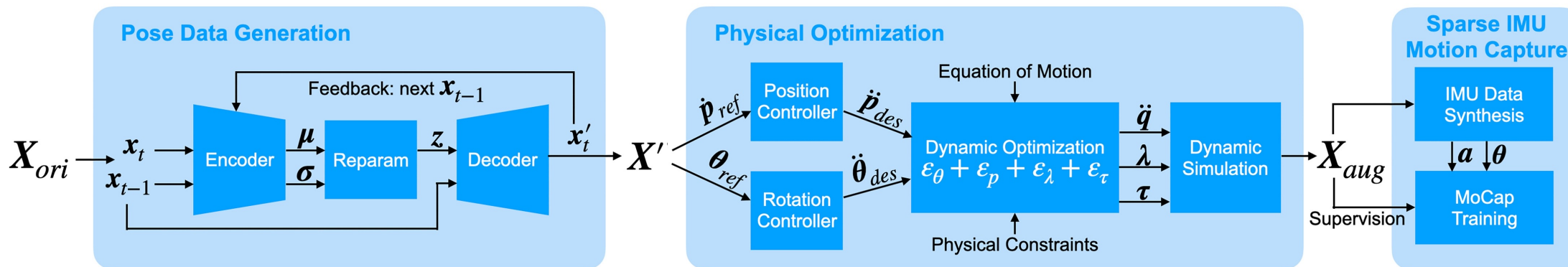
Chun Yu



Chen Liang



Yuanchun Shi



PoseAugment: Generative Human Pose Data Augmentation with Physical Plausibility for IMU-based Motion Capture
(Code: <https://github.com/CaveSpiderLZJ/PoseAugment-ECCV2024>)