

PARSA ESMATI

RESEARCHER

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RESEARCH EXPERIENCE

SEA: State-Exchange Attention for High-Fidelity Physics-Based Transformers **NeurIPS 24**

Mar 2024- May 2024

- A first step towards physics aware models with information exchange mechanisms amongst physical states. Setting the foundations for physics aware video generative models.
- Introduction of a ViT-like encoder for meshed data in 2D and 3D space
- Assembly of a LLAMA 3 inspired temporal transformer with an additional adaptive layer norm for physics domain conditioning.

Authors: **Parsa Esmati**, Amirhossein Dadashzadeh, Vahid Goodarzi, Nicolas Larrosa, Nicolo Grilli

C-STAR: Collaborative Curriculum Self-Training with Adaptive Regularization for Source-Free Video Domain Adaptation **CVPR 25** (Under review)

Jul 2024- Ongoing

- Details will be disclosed upon request

Authors: Amirhossein Dadashzadeh, **Parsa Esmati**, Majid Mirmehdi

Simulating chemical mixing and molten pool shape in dissimilar welds using thermal fluid dynamics **IJHMT**

Nov 2023- Jan 2024

- Development of a computational framework to simulate fluid flow, mixing of liquids, heat transfer via ray tracing etc.
- Rigour validation of the framework on manufacturing processes in nuclear industry

Authors: **Parsa Esmati**, Thomas Flint, Fatma Akyel, Simon Olschok, Uwe Reisgen, Philip Cardiff, Nicolas Larrosa, Nicolo Grilli

Version 2.0 — LaserbeamFoam: Laser ray-tracing and thermally induced state transition simulation toolkit **SoftwareX**

Nov 2023- Dec 2024

- Addition of a multiphase interaction capabilities to a computational framework designed for manufacturing in nuclear industry and advance materials.

Authors: Thomas Flint, Joseph Robson, **Parsa Esmati**, Nicolo Grilli, Gowthaman Parivendhan, Philip Cardiff

EDUCATION AND WORK

Mechanical Engineering MEng

2018 - Sep 2022

University of Bristol

School of Electrical, Electronics and Mechanical Engineering

PhD in Solid Mechanics Research Group

Sep 2022 - Ongoing

University of Bristol

School of Electrical, Electronics and Mechanical Engineering

TEACHING EXPERIENCE

- Engineering sciences (EEME University of Bristol)
- Python Programming (EEME University of Bristol)
- Fluid Mechanics and Heat Transfer (EEME University of Bristol)
- Aerospace Vehicle Design and System Integration (CAME University of Bristol)

SKILLS

Programming

Python (Proficient), C++ (Expert), C (Expert), Java (Intermediate), Matlab (Expert)

ML Packages and Tools

Pytorch (Proficient), NumPy (Proficient), Tensorflow (Comfortable), Keras (Basic), Jax (Basic)

Engineering and design Packages

Fusion360 (Proficient), Inventor (Proficient), SOLIDWORKS (Comfortable), Gmsh (Comfortable), OpenFOAM (Proficient), MOOSE (Comfortable)

FURTHER INFORMATION

Research interest (Keywords)

- Spatio-temporal Diffusion models
- Spatio-temporal autoregressive generation
- Physics aware video generation
- 3D and meshed data

Research style

Rapid and precise iterative approach over the problems