Csala Hunor

Date of birth
11/10/1996

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Personal
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Languages
Hungarian ★★★★★
English ★★★★★
Romanian ★★★★☆
Italian ★★☆☆☆

Programming
MATLAB
python
C++
R
Wolfram
HPC/slurm

CFD
OpenFOAM
FEniCS
SimVascular
Palabos
ANSYS Fluent

Education

2022 - **PhD in Mechanical Engineering** — University of Utah
Computational Biomechanics Group
Data-driven cardiovascular flow modeling - FEniCS, SimVascular
Nonlinear dimensionality reduction/ Manifold learning - pyTorch, scikit-learn
- PCA, Autoencoder, KPCA, LLE, Isomap, LEM

2021 - 2022 **PhD in Mechanical Engineering** — Northern Arizona University
Cardiovascular Biomechanics Lab, transferred to UofUtah

2019 - 2021 **MSc in Mechanical Engineering Modelling** — Budapest University of Technology and Economics
Fluid and Solid Mechanics modules
Thesis: Emerging fractal patterns in real 3D vessel geometries - Palabos

2020 **MSc in Mathematical Engineering** — University of Naples Federico II
Erasmus Exchange Semester
Nonlinear systems, Numerical Methods, Transport Phenomena

2015 - 2019 **BSc in Mechanical Engineering** — Budapest University of Technology and Economics
Mechanical Engineering Development specialization
GPA 4.67/5.00 - top 1% out of 400 students
Thesis: Model predictive control of a balance board - Matlab

2011 - 2015 **Baccalaureate** — Márton Áron Theoretical High School, Csíkszereda
Mathematics-Computer Science class

Experience

2022 - **Graduate Research Assistant** — SCI, University of Utah, Salt Lake City
Low-dimensional embedding of unsteady cardiovascular flows - python
Handling corrupt fluid flow data using machine learning and low-dimensional manifolds

2018 - 2021 **Research Engineer Intern** — Furukawa Electric Institute of Technology, Budapest
Regression analysis of LES data - R
CFD analysis of an MOCVD reactor - OpenFOAM
- Influence of flow guide geometries on the deposition homogeneity
- Different thermal boundary conditions

Comprehensive literature review of nanofluids
Optical ray tracing - Tonatiuh
- Multiple reflections inside a laser welding keyhole

Multiphysics simulation of laser welding of copper materials - OpenFOAM
- Development of a new solver with a radiation model for lasers
- Laser beam simulated with Lagrangian particles with multiple reflections
- Multiphase flow using the VOF method

2017 - 2018 **Laboratory assistant** — Budapest University of Technology and Economics
Faculty of Mechanical Engineering, Department of Hydrodynamic Systems
Helped in teaching experimental and computer lab sessions for undergraduate students

CAD
SolidWorks

FEA
ANSYS Mechanical

Documents
LaTeX
MS Office

Social

Hobby
Q

Papers

2022 **Comparing different nonlinear dimensionality reduction techniques for data-driven unsteady fluid flow modeling** Physics of Fluids
https://doi.org/10.1063/5.0127284

Conferences & Talks

2023.06 **SB3C** Vail, CO, USA
Enhancing Corrupt Cardiovascular Flow Data with Machine Learning

2022.11 **APS Division of Fluid Dynamics** Indianapolis, IN, USA
Manifold learning and deep autoencoders for nonlinear embedding of unsteady fluid flows

2022.07 **Summer School on Reduced Order Methods in CFD** SISSA, Trieste, Italy
Poster: Comparing Different Nonlinear Dimensionality Reduction Techniques for Data-Driven Unsteady Fluid Flow Modeling

2022.06 **19th USNCTAM** Austin, TX, USA
Comparing Different Nonlinear Dimensionality Reduction Techniques for Data-Driven Unsteady Fluid Flow Modeling

Honors and certifications

2021-22 **NAU Presidential Fellow** Northern Arizona University

2019.11 **TOEFL iBT** ETS
116/120

2015.05 **Barabási Albert-László Prize** Márton Áron Theoretical High School
Most outstanding student in Physics

2014.03 **3rd Prize** XXIII. International Hungarian Mathematics Competition
NMMV - Creative, extracurricular math competition for high school students from Hungary, Romania, Serbia, Ukraine and Slovakia

2014.03 **ECDL Complet** ECDL Romania

Organizations

2018-2021 **Márton Áron Special College** Eötvös Loránd University, Budapest
MÁSZ aims to strengthen the relations of young Hungarian people living outside Hungary to their homeland. Personal projects in the Engineering Group. Published book chapter (in Hungarian): *Annales II. Az ELTE Márton Áron Szakkollégium évkönyve 2019*, p. 51-60 HU ISSN 2676-8518