Yerbol Palzhanov
Research Scientist, PhD
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EDUCATION

2019 - 2023 Ph.D in Computational Science, University of Houston, Houston, TX
thesis: Numerical finite element methods for phase field equations
advisors: M. Olshanskii; A. Quaini

2015 - 2017 M.S. in Mathematics, Atyrau State University, Atyrau, Kazakhstan
thesis: Numerical methods based on energy minimization principle for computing thermal fields
advisor: B. Kenzhegulov

2008 - 2012 B.S. in Mathematics, Auezov University, Shymkent, Kazakhstan

PUBLICATIONS

6. *A scalar auxiliary variable unfitted FEM for the surface Cahn-Hilliard equation*,
M. Olshanskii, Y. Palzhanov, A. Quaini – Journal of Scientific Computing, Oct 2023
5. *On fusogenicity of positively charged phased-separated lipid vesicles: experiments and computational simulations*,
Y. Wang, Y. Palzhanov, D Dang, A. Quaini, M. Olshanskii, S. Majd, – Biomolecules, Sep 2023
4. *Lipid domain coarsening and fluidity in multicomponent vesicles: A continuum model and its experimental validation*,
Y. Wang, Y. Palzhanov, A. Quaini, M. Olshanskii, S. Majd – BBA - Biomembranes, 2022
3. *A comparison of Cahn-Hilliard and Navier-Stokes-Cahn-Hilliard models on manifolds*,
M. Olshanskii, Y. Palzhanov, A. Quaini – Vietnam Journal of Mathematics, 2022
2. *A decoupled, stable, and linear FEM for a phase-field model of variable density two-phase incompressible surface flow*,
Y. Palzhanov, A. Zhiliakov, A. Quaini, M. Olshanskii – Computer Methods in Applied Mechanics and Eng., 2021
1. *Numerical methods based on energy minimization principle for computing thermal fields*,
Y. Palzhanov, 2017 – Master's thesis

EXPERIENCE

Graduate Researcher @ University Of Houston 2019 – 2024

- Developing Navier–Stokes–Cahn–Hilliard model for two-phase surface flows
  - Contributed to finite element C++ package DROPS - CFD tool for simulating two-phase flows to model flows
  - Integrated the collection of scientific software libraries Trilinos(BELOS, AMESOS2, EPETRA) to solve systems of linear equations with Flexible GMRES
  - *Tools & Frameworks:* C++, Trilinos, Parallel Computing, Linux, CMAKE, GIT, Paraview
- Modeling and experimenting with multicomponent lipid vesicles
  - Implemented unconditionally energy stable *scalar auxiliary variable* algorithm for phase field equations
  - Studied fusogenicity of positively charged lipid vesicles via thermodynamically consistent NSCH H-model
  - *Tools & Frameworks:* MATLAB, Python, DROPS, Cluster & Cloud Computing
- Reduced order modeling with Convolutional Autoencoders, LSTM, and Transformers
  - Developed convolutional autoencoder neural network for order reduction of advection-dominated 2D flows
  - Implemented LSTM for temporal evolution prediction of rising thermal bubble
  - *Tools & Frameworks:* OpenFoam, Tensorflow, Cluster & Cloud Computing

CERTIFICATES

TensorFlow Developer certificate
Hands-on four-course Professional Certificate program, on Convolutional Neural Networks, Natural Language Processing (NLP) and Time Series Analysis in Tensorflow.