Ilona Ambartsumyan

(412) 961-3194, ila6@pitt.edu, ailona.github.io
Visa status: F1(CPT/OPT eligible)

EDUCATION

University of Pittsburgh, PhD in Mathematics, 2013 - 2018(est)
Overall GPA: 4.0/4.0, Advisor: Dr. Ivan Yotov

Moscow Institute of Physics and Technology, B.S. and M.S. in Applied Mathematics and Physics, 2007 - 2013, Overall GPA: 4.7/5.0

RESEARCH INTERESTS

My research interests are in numerical analysis and scientific computing with emphasis on coupled multiphysics problems. My current work focuses on fluid - poroelastic structure modeling with various applications, including hydralic fracturing, CO_2 sequestration and hemodynamics.

EXPERIENCE

Research Assistant Summer 2014 - present
University of Pittsburgh, Mathematics Department, Pittsburgh, USA

- Derivation of new methods for modeling interaction between fluid and poroelastic media, including new models/coupling strategies, efficient discretization techniques and design of new finite element spaces
- Analysis of the well-posedness of continuous models; stability and error analysis of discrete/semi-discrete models, as well as implementation of the proposed methods, using deal.II, FreeFEM++ (C++) and FEniCS (Python) scientific packages

Teaching Assistant Summer 2014 - Fall 2015
University of Pittsburgh, Mathematics Department, Pittsburgh, USA

- Introduction to Theoretical Mathematics, recitations (Fall 2015)
- Analytic Geometry and Calculus 1&2, recitations & labs (Summer 2014, Summer 2015)
- Business Calculus, recitations (Fall 2014)

Senior Analyst of Mass Market Marketing April 2012 - July 2013
MegaFon, OJSC, Moscow, Russia
I was working on development of product strategy and analysis of the impact of new products on main business indicators. I launched three voice plans for B2C market and supervised the advertising campaigns in Moscow region.

FELLOWSHIPS & AWARDS

- *Andrew Mellon Predoctoral Fellowship*, 2016-2017 (awarded to students of exceptional promise and ability when they have advanced to the dissertation stage)
- *Graduate Research Fellowship*, 2014-present (research grants funded by government and private agencies to provide the student with valuable research training and experience)
- *Arts & Sciences Graduate Fellowship*, 2013-2014 (used to recruit doctoral students of exceptional promise and ability either when they first enroll in the PhD program or for later years)
- *SIAM Graduate Student travel grant*, 2017 (to present research talk at SIAM CSE)
- *University of Pittsburgh, travel grant*, 2016 (to present research poster at InterPORE)
- *Department of Mathematics, University of Pittsburgh travel grant*, 2016 (to present research talk at Finite Element Circus)

- *Department of Mathematics, Texas A&M, travel grant*, 2016 (Geometric PDEs and their Approximations, Winter Graduate School)
- *IMA Mathematical Modeling in Industry XIX, travel grant*, 2015

PUBLICATIONS

- I. Ambartsumyan, E. Khattatov, J. Lee, I. Yotov, *"Higher order multipoint flux mixed finite element methods"*, submitted to Mathematics of Computation, AMS journal
- I. Ambartsumyan, E. Khattatov, I. Yotov, *"Coupled multipoint flux and multipoint stress mixed finite element method for the Biot poroelasticity model"*, preprint
- I. Ambartsumyan, E. Khattatov, I. Yotov, *"Mixed finite volume methods for linear elasticity"*, International Conference on Finite Volumes for Complex Applications, pp. 377-385. Springer, Cham, 2017.
- I. Ambartsumyan, V.J. Ervin, T. Nguen, I. Yotov, *"A nonlinear Biot-Stokes model for the interaction of a non-Newtonian fluid with poroelastic media, parts I & II"*, preprint
- I. Ambartsumyan, E. Khattatov, J. Nordbotten and I. Yotov, *"A multipoint stress mixed finite element method for elasticity, parts I & II"*, preprint
- I. Ambartsumyan, E. Khattatov, I. Yotov and P. Zunino,*" A Lagrange multiplier method for a Stokes-Biot fluid-poroelastic structure interaction model"*, submitted to Numerische Matematik journal
- I. Ambartsumyan, E. Khattatov, I. Yotov and P. Zunino, *"Simulation of Flow in Fractured Poroelastic Media: A Comparison of Different Discretization Approaches"*, FDM 2014: 3-14
- I. Ambartsumyan, E. Khattatov, C. Wang and I. Yotov, *"Stochastic multiscale flux basis for Stokes- Darcy flows"*, preprint
- I. Ambartsumyan, C. He, E. Khattatov, S. Kim, L. Mrad, *"Mapping of temperatures from coarser to finer grid using temporal derivatives"*, IMA MMI XIX workshop, technical report

TALKS & POSTERS

- *"Numerical Study of Gas Mobility Control Techniques during CO_2 Sequestration in Cranfield"*, 2017 DOE ASCR Applied Mathematics Principal Investigators Meeting, Rockville, MD, September 2017, substitute for Dr. Mary Wheeler (poster)
- *"Mathematical and numerical modeling for flow in fractured poroelastic media"*, ICES Center for subsurface modeling seminar, University of Texas at Austin, August 2017 (talk)
- *"A nonlinear Biot-Stokes model for the interaction of a non-Newtonian fluid with poroelastic media"*, SIAM Computational Science and Engineering, Atlanta GA, February 2017 (talk)
- *"A multipoint stress mixed finite element method for linear elasticity"*, 8th International Conference on Porous Media, InterPORE, Cincinnati OH, May 2016 (poster)
- *"A Lagrange multiplier method for flow in fractured poroelastic media"*, Numerical Analysis and Predictibility of Fluid Motion, University of Pittsburgh, May 2016 (poster)
- *"A Lagrange multiplier method for flow in fractured poroelastic media"*, Finite Element Circus, University of Maryland, April 2016 (talk)
- *"A multipoint stress mixed finite element method for linear elasticity*, GradEXPO, University of Pittsburgh, March 2016 (poster)
- *"A multipoint stress mixed finite element method for elasticity"*, Computational Mathematics Seminar, University of Pittsburgh, December 1, 2015 (talk)

CONFERENCES & WORKSHOPS

- *Numerical Analysis and Predictability of Fluid Motion*, University of Pittsburgh, May 2016.
- *Geometric PDEs and their approximations (with implementation in Deal.II)*, Texas A&M University, January 2016.
- *Nonlinear PDEs, Numerical Analysis, and Applications*, University of Pittsburgh, October 2015.
- *IMA Mathematical Modeling in Industry XIX*, University of Minnesota, August 2015.
- *Workshop on Computational Geomechanics*, University of Pittsburgh, May 2014.

TECHNICAL SKILLS

Languages & Packages : C++, Matlab, deal.II, FEniCS, FreeFEM++
Documentation: LaTeX, Microsoft Office, HTML