Alex Vlasiuk

alex@vlasiuk.com

SUMMARY

Math PhD with research and development experience in computational geometry and optimization.

SKILLS

- Programming: C, C++, Python, Matlab.
- Nonlinear smooth optimization, including multiple precision; BFGS, IPOpt, JAX.
- Data analysis: scikit-learn, pandas, OpenCV, R.

EXPERIENCE

PTC, Senior Software Engineer 6/2023–

- On the core geometry team for Creo – the PTC flagship CAD product. Development and maintenance of the geometry attachment functionality, its applications to engineering of composites.
- Design and implementation of an internal debugging and reporting platform. Recording and tracking of geometry creation for debugging and verification purposes.

Vanderbilt University, Senior Lecturer 8/2022–5/2023

- Conducted a numerical study of magnetic dipole interactions on planar lattices. Optimization using the IPOpt library and objective function evaluation with JAX.
- Advised two postdocs on a theoretical project modelling knots and links, and studying knot invariants by means of energy-like functionals.

Vanderbilt University, Postdoctoral Scholar 8/2021–8/2022

- Developed a multiple precision optimization package based on L-BFGS. Used it to approximate spherical codes with 20+ correct decimal places, allowing to recover their algebraic representations. Multiple precision implemented as a C++ template wrapper around the MPFR class.
- Won a joint Collaborate@ICERM travel grant, funding a meeting for a team of researchers.

Florida State University, Postdoctoral Scholar 8/2018–8/2021

- Developed Matlab packages for efficient point distribution in 3d with prescribed density. Both surface and volume distribution handled, up to 1M+ points.
- Advised two undergraduate research projects on collective dynamics and emergent behavior. Taught a graduate-level course on Lebesgue integration.
- Won an AMS-Simons travel grant.

MATHEMATICAL

Optimization over measures, computational geometry, point distributions, statistical mechanics.

2024 Alexanderson Award of the American Institute of Mathematics.

15+ publications and preprints in math journals, incl. Advances in Mathematics (in top 6 for pure math), SIAM Journal on Mathematical Analysis, Computers & Mathematics with Applications, etc.

EDUCATION

ICERM, Brown University, Resident graduate student researcher 2–4/2018

Vanderbilt University, Ph.D. in Mathematics 8/2018

Université de Toulon, Master I Mathématiques 5/2013

Taras Shevchenko National University of Kyiv, B.Sc. 6/2013

Updated: January 25, 2025.