

Alex Vlasiuk

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SUMMARY

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

SKILLS AND TOOLS

- Programming languages: C, C++, Python, Matlab
- Optimization libraries: L-BFGS-B, IPOpt, NLOpt, JAXOpt
- Data analysis tools: scikit-learn, pandas, OpenCV, R
- Development tools: Git, CMake, GDB, Valgrind

WORK EXPERIENCE

PTC, Senior Software Engineer

6/2023–

- Member of the core geometry team on Creo – the PTC flagship CAD product. Developing and maintaining the feature attachment functionality, used to add new geometric features to a model.
- Designing and implementing a geometry capture tool allowing to track generation of new model features, for internal 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.

SCIENTIFIC INTERESTS

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

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.

Taught both undergraduate and graduate math courses, with elements of computer algebra and R.

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