

CURRICULUM VITAE

YAKOV BERCHENKO-KOGAN

Research interests:

- Differential geometry, gauge theory, geometric analysis.
- Dynamical systems, geometric mechanics, structure-preserving numerical methods.

Education and Appointments:

- Washington University in St. Louis, Chauvenet Postdoctoral Lecturer, 2016–2019.
- Massachusetts Institute of Technology, Ph.D. in mathematics under Tomasz Mrowka, 2016.
- California Institute of Technology, B.S. in mathematics with a minor in control and dynamical systems, 2011.

Research Publications:

- Y. I. Berchenko-Kogan. Yang–Mills replacement. Submitted to *Journal of Geometric Analysis*, 2016. <https://arxiv.org/abs/1608.06933>.
- D. Shi, Y. I. Berchenko-Kogan, D. V. Zenkov, and A. M. Bloch. Hamel’s formalism for infinite-dimensional mechanical systems. *Journal of Nonlinear Science*, 27(1):241–283, 2017.
- Y. I. Berchenko-Kogan. Minimum product sets sizes in nonabelian groups. *Journal of Number Theory*, 132(10):2316–2335, 2012.
- Y. I. Berchenko-Kogan. Uncovering the Lagrangian from observations of trajectories. Caltech senior thesis, 2011. <http://thesis.library.caltech.edu/9224/>.
- Y. I. Berchenko-Kogan. Distance in the ellipticity graph, 2010. <http://arxiv.org/abs/1006.4853>.

General Audience Publications:

- Y. I. Berchenko-Kogan. What do grad students in math do all day? *Math Horizons*, 20(3):18–19, 2013.
- Y. I. Berchenko-Kogan. O que estudantes de pós-graduação fazem o dia todo? *Cálculo: Matemática para todos*, 4(45):64–65, 2014.
- Y. I. Berchenko-Kogan. More than math: The lasting benefits of summer programs. *Imagine*, 21(2):20–21, 2013.

Scholarships and Fellowships:

- National Defense Science and Engineering Graduate Fellowship, 2011–2014.
- NSF Graduate Research Fellowship Award, declined to accept NDSEG fellowship, 2011.
- Axline Scholarship covering full tuition, Caltech, 2007–2011.

Awards:

- AMS–Simons Travel Grant, 2017–2019.
- Johnson Undergraduate Mathematics Prize, Caltech Math Department, 2011.
- Putnam Competition member of first place team, 2010.
- Putnam Competition ninth place nationally, 2009.
- USA Mathematics Olympiad winner, 2006.

Selected Research Presentations:

- Foundations of Computational Mathematics Conference, contributed poster, 2017.
- Simons Center for Geometry and Physics, mathematics of gauge fields seminar, invited talk, 2017.
- WUSTL geometry and topology seminar, 2016, 2017.
- WUSTL analysis seminar, 2016.
- AMS Sectional Meeting, Rutgers, special session in geometric analysis, invited talk, 2015.
- Institute for Computational and Experimental Research in Mathematics, Integrability in Mechanics and Geometry, contributed poster, 2015.
- Caltech applied geometry lab, invited talk, 2011.
- Caltech geometry and topology seminar, invited talk, 2009.

Selected Expository Presentations.

- Burnside's lemma, WUSTL undergraduate math club, 2017.
- Atiyah, Hitchin, and Singer's paper: Self-duality in four-dimensional Riemannian geometry, graduate geometry seminar, 2015.
- Chern's paper: A simple intrinsic proof of the Gauss-Bonnet formula for closed Riemannian manifolds, graduate geometry seminar, 2015.
- Chern-Simons invariants, graduate geometry seminar, 2014.
- Colding, Imanen, and Minicozzi's paper: Rigidity of generic singularities of mean curvature flow, geometric analysis reading group, 2014.
- Proving finite division rings are fields using cyclotomic polynomials, graduate pure math seminar, 2014.
- Clifford algebras and spin structures, Atiyah-Singer index theorem reading group, 2013.
- Lagrangian mechanics and variational integrators, graduate applied math seminar, 2013.
- Beale, Kato, and Majda's paper: On the breakdown of smooth solutions for the 3-D Euler equations, graduate analysis seminar, 2012.
- Stallings foldings and subgroups of free groups, graduate pure math seminar, 2012.

Teaching:

- Instructor, WUSTL, ordinary differential equations, point-set topology, 2016.
- Section instructor, MIT, ordinary differential equations, 2015.
- Mentor, MIT Directed Reading Program for undergraduates, 2015.
- Instructor, Art of Problem Solving, 2011–2014.
- Mathcounts coach, Walter Reed Middle School, North Hollywood, CA 2010–2011.
- Staff, Canada/USA Mathcamp, 2010.

Outreach and Volunteer Activities:

- Instructor, MIT Splash program for middle and high school students, 2011–2014.
- Top Writer, Quora question and answer website, 2013.
- Volunteer, MITxplore, Math Day, 2013.
- Instructor, Graham and Parks elementary school, Cambridge, MA, after school math program, 2011.
- Organizer, Caltech undergraduate seminar, 2009–2011.
- Founder and director, Caltech Harvey Mudd Math Competition, 2010.
- President, Caltech math club, 2008–2010.
- Coach, Southern California American Regions Math League (ARML) team, 2008–2010.