

CURRICULUM VITAE

YAKOV BERCHENKO-KOGAN

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Research Interests:

- Geometric numerical analysis, geometric mechanics.
- Differential geometry, geometric analysis, gauge theory.

Education and Appointments:

- University of Hawaii at Manoa, temporary assistant professor, 2019–2022.
- 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.

Teaching:

- University of Hawaii: calculus III, graduate PDEs, 2019.
- Washington University in St. Louis: calculus II, differential equations, math for the physical sciences, undergraduate analysis, point-set topology, graduate analysis, 2016–2019.
- Washington University in St. Louis, mentor of a reading course in analysis, 2019.
- MIT, recitation instructor, ordinary differential equations, 2015.
- MIT, mentor, Directed Reading Program for undergraduates, 2015.

Fellowships and Awards:

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

Research Publications:

- Y. I. Berchenko-Kogan and A. Stern. Constraint-preserving hybrid finite element methods for the Yang–Mills equations. In preparation.
- Y. I. Berchenko-Kogan and A. Stern. Constraint-preserving hybrid finite element methods for Maxwell’s equations, 2019. <https://arxiv.org/abs/1907.00084>.
- Y. I. Berchenko-Kogan. Duality in finite element exterior calculus and Hodge duality on the sphere, 2019. <https://arxiv.org/abs/1906.06354>.
- Y. I. Berchenko-Kogan. The entropy of the Angenent torus is approximately 1.85122. *Journal of Experimental Mathematics*, 2019. <https://doi.org/10.1080/10586458.2019.1583616>.
- Y. I. Berchenko-Kogan. Duality in finite element exterior calculus, 2018. <https://arxiv.org/abs/1807.01161>.
- Y. I. Berchenko-Kogan. Yang–Mills Replacement. *J. Geom. Anal.*, 28(4):3603–3656, 2018. <https://rdcu.be/BAr0>.
- 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. <https://rdcu.be/vtfl>.

- Y. I. Berchenko-Kogan. Minimum product sets sizes in nonabelian groups. *Journal of Number Theory*, 132(10):2316–2335, 2012. <https://doi.org/10.1016/j.jnt.2012.04.011>
- Y. I. Berchenko-Kogan. Uncovering the Lagrangian from observations of trajectories. Caltech senior thesis, 2011. <https://thesis.library.caltech.edu/9224/>.
- Y. I. Berchenko-Kogan. Distance in the ellipticity graph, 2010. <https://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. Translated by Márcio Simões.
- Y. I. Berchenko-Kogan. More than math: The lasting benefits of summer programs. *Imagine*, 21(2):20–21, 2013.

Selected Research Presentations:

- AMS Sectional Meeting, University of Hawaii, special session on numerical methods for PDEs, 2019.
- College of Charleston, colloquium, 2019.
- Oklahoma State University, colloquium, 2019.
- North Carolina State University, geometry and topology seminar, 2018, 2019.
- Washington University in St. Louis, geometry and topology seminar, 2016–2019.
- Missouri University of Science and Technology, colloquium, 2018.
- Finite Element Circus, University of Delaware, 2018.
- UC San Diego, Center for Computational Mathematics seminar, 2018.
- Kansas State University, applied math seminar, 2018.
- Foundations of Computational Mathematics Conference, poster, 2017.
- Simons Center for Geometry and Physics, mathematics of gauge fields seminar, 2017.
- Washington University in St. Louis, analysis seminar, 2016.
- AMS Graduate Student Conference, Brown University, 2016.
- AMS Sectional Meeting, Rutgers University, special session on geometric analysis, 2015.
- ICERM, workshop on integrability in mechanics and geometry, poster, 2015.
- Caltech applied geometry lab, 2011.
- Caltech geometry and topology seminar, 2009.

Outreach, Other Teaching, and Volunteer Activities:

- Washington University in St. Louis, math circle, speaker, 2018.
- Washington University in St. Louis, organizer of reading seminar on *Complex Semisimple Lie Algebras* by Serre, 2018.
- Washington University in St. Louis, math club, speaker, 2017.
- Art of Problem Solving, instructor, 2011–2014.
- Instructor, MIT Splash program for middle and high school students, 2011–2014.
- Top Writer, Quora question and answer website, 2013.
- Organizer, Caltech undergraduate math seminar, 2009–2011.
- Founder and director, Caltech Harvey Mudd Math Competition, 2010.
- President, Caltech math club, 2008–2010.
- Staff, Canada/USA Mathcamp, 2010.