## Oleg Lazarev

| Contact                       | University of Massachusetts, Boston                                                                                                                       | oleg.lazarev@umb.edu                                   |               |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|---------------|
| INFORMATION                   | Wheatley W-03-154-07<br>100 William T. Morrissey Blvd.<br>Boston, MA 02125 USA                                                                            | https://www.math.umb.ed                                | u/~oleg/      |
| Research<br>Interests         | Symplectic and contact topology, h-principles, mirror symmetry and algebraic geometry, stable homotopy theory and $\infty$ -categories, dynamical systems |                                                        | ic geome-     |
| Employment                    | Assistant Professor, University of Massachusetta<br>partment                                                                                              | s, Boston, Mathematics De-                             | 2021- present |
|                               | Simons Postdoctoral Fellow, Harvard University                                                                                                            | y, Mathematics Department                              | 2020-2021     |
|                               | NSF Postdoctoral Fellow, Columbia University                                                                                                              | , Mathematics Department                               | 2017-2020     |
| Education                     | <b>Stanford University</b><br>Ph.D. in Mathematics, September 2017                                                                                        |                                                        | 2012-2017     |
|                               | <ul> <li>Dissertation title: Flexible Weinstein do<br/>symplectic and contact topology</li> <li>Advisor: Yakov Eliashberg</li> </ul>                      | omains and applications to                             |               |
|                               | Independent University of Moscow                                                                                                                          |                                                        | Spring 2010   |
|                               | Math in Moscow                                                                                                                                            |                                                        |               |
|                               | Princeton University                                                                                                                                      |                                                        | 2008-2012     |
|                               | <ul> <li>A.B. in Mathematics, Summa cum Laude</li> <li>Undergraduate thesis: A complex variab<br/>Rice theorem</li> <li>Advisor: Elliott Lieb</li> </ul>  | ble extension of the Hobby-                            |               |
| Fellowships and               | NSF Grant in Topology                                                                                                                                     |                                                        | 2023-         |
| Awards                        | NSF Postdoctoral Research Fellowship                                                                                                                      |                                                        | 2017-2020     |
|                               | NSF Graduate Research Fellowship                                                                                                                          |                                                        | 2012-2017     |
|                               | Middleton Miller '29 Prize, Princeton Ma<br>independent work in mathematics                                                                               | thematics Department, for                              | 2012          |
|                               | Sigma Xi Book Award for Outstanding F<br>ematics Department                                                                                               | Research, Princeton Math-                              | 2012          |
|                               | AMS Math in Moscow Scholarship                                                                                                                            |                                                        | 2009          |
| Publications and<br>Preprints | Andrew Hanlon, Jeff Hicks, Oleg Lazare<br>topology and symplectic geometry. 2023. arxiv                                                                   | ev. Relating categorical dim<br>r:2308.13677 p. 1- 38. | ensions in    |
|                               | Kai Cieliebak, Oleg Lazarev, Thomas Massoni, Agustin Moreno. Floer theory of Anosov flows in dimension three. 2022. arXiv:2211.07453. p. 1- 60.           |                                                        |               |

Oleg Lazarev, Zach Sylvan, and Hiro Lee Tanaka. The  $\infty$ -category of stabilized Liouville sectors. 2021. arXiv:2110.11754. p. 1- 105.

Oleg Lazarev, Zach Sylvan, and Hiro Lee Tanaka. Localization and flexibilization in symplectic geometry. 2021. arXiv:2109.06069. p.1-53.

Andrew Hanlon, Jeff Hicks, Oleg Lazarev. Resolutions of toric subvarieties by line bundles and applications. 2023. Accepted to Forum of Mathematics Pi, p. 1- 62. arxiv:2303.03763.

**Ipsita Datta, Oleg Lazarev, Chindu Mohanakumar, Angela Wu** Weinstein presentations for high-dimensional antisurgery. 2023. Accepted to Algebraic and Geometric Topology, p. 1-28. arXiv: 2310.03133.

**Oleg Lazarev.** Symplectic flexibility and the Grothendieck group of the Fukaya category. *Journal of Topology.* 15(1) 204-237 (2022). arXiv: 1910.01101.

**Oleg Lazarev and Zach Sylvan.** Prime-localized Weinstein subdomains. *Geometry and Topology.* 27(2), 699-737 (2023). arXiv:2009.09490.

**Oleg Lazarev.** Maximal contact and symplectic structures. *Journal of Topology.* 13(3), 1058-1083 (2020). arXiv:1810.11728.

**Oleg Lazarev.** H-principles for regular Lagrangians. *Journal of Symplectic Geometry*, 18(4), 1071-1090 (2020). arXiv:1808.05993.

**Oleg Lazarev.** Simplifying Weinstein Morse functions. *Geometry and Topology.* 24, 2603 - 2646 (2020). arXiv:1808.03676.

**Oleg Lazarev.** Contact manifolds with flexible fillings. 2016. *Geometric and Functional Analysis.* 30, 188 - 254 (2020). arXiv:1610.04837.

Yakov Eliashberg, Sheel Ganatra, and Oleg Lazarev. Flexible Lagrangians. *International Mathematics Research Notices*, 2020(8), 2408 - 2435 (2020). arXiv:1510.01287.

**Oleg Lazarev, Matt Mizuhara, Ben Reid, and Holly Swisher.** An Extension of a Proof of the Ramanujan Congruences for Multipartitions. *Ramanujan Journal*, 45(1), 1–20, (2018). arXiv:1601.05287.

Levent Alpoge, Nadine Amersi, Geoffrey Iyer, Oleg Lazarev, Steven J. Miller, and Liyang Zhang. Maass waveforms and low-lying zeros. *Analytic number theory*, 19–55. Springer, Cham, (2015).

Geoffrey Iyer, Oleg Lazarev, Steven J. Miller, and Liyang Zhang. Finding and counting MSTD sets. *Combinatorial and additive number theory—CANT 2011* and 2012, volume 101 of Springer Proc. Math. Stat., 79–98. Springer, New York, (2014).

Oleg Lazarev, Steven J. Miller, and Kevin O'Bryant. Distribution of missing sums in sumsets. *Experimental Mathematics*, 22(2), 132–156, (2013).

**Oleg Lazarev and Elliott H. Lieb.** A smooth, complex generalization of the Hobby-Rice theorem. *Indiana University Mathematics Journal*, 62(4):1133–1141 (2013).

Geoffrey Iyer, Oleg Lazarev, Steven J. Miller, and Liyang Zhang. Generalized more sums than differences sets. *Journal of Number Theory*, 132(5), 1054–1073, (2012).

|               | <b>Oleg Lazarev and Holly Swisher.</b> A combinatorial proof of a recursi multipartitions. <i>Integers</i> , 12(1), 113–127, (2012). | ve formula for                             |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Invited talks | Virtual syzygies and mirror symmetry seminar                                                                                         | Oct 2024                                   |
|               | Brandeis Topology Seminar (2 talks)                                                                                                  | Sept 2024                                  |
|               | Summer school on h-principles, Instituto de ciencias Mathematicas Madrid (2 talks)                                                   | June 2024                                  |
|               | MIT Symplectic Geometry Seminar                                                                                                      | May 2024                                   |
|               | AIM workshop on Higher-dimensional contact topology                                                                                  | April 2024                                 |
|               | Washington University Topology Seminar (2 talks)                                                                                     | March 2024                                 |
|               | Dartmouth Topology Seminar                                                                                                           | Feb 2024                                   |
|               | Northeastern University Topology Seminar                                                                                             | Oct 2023                                   |
|               | Stanford Symplectic Geometry seminar                                                                                                 | June 2023                                  |
|               | Louisiana State University Geometry/Topology seminar                                                                                 | May 2023                                   |
|               | The Haitian Scientific Society seminar (Boston)                                                                                      | April 2023                                 |
|               | University of Montreal symplectic seminar                                                                                            | Dec. 2022                                  |
|               | Fall Eastern AMS Sectional Meeting                                                                                                   | Oct. 2022                                  |
|               | Symplectic 'N' Contact Topology, Early-Career Conference, mentor                                                                     | August 2022                                |
|               | Emmanuel Giroux birthday conference, Institut Henri Poincaré                                                                         | July 2022                                  |
|               | Boston University/Keio University/Tsinghua University workshop on Geometry and Mathematical Physics                                  | June 2022                                  |
|               | University of Maryland Geometry seminar                                                                                              | April 2022                                 |
|               | Lagrangian Floer Theory Simons Center Workshop                                                                                       | March 2022                                 |
|               | Northern California Symplectic Geometry Seminar                                                                                      | March 2022                                 |
|               | Stony Brook Low-Dimensional Topology, Gauge Theory, and Symplectic Geometry Seminar                                                  | February 2022                              |
|               | IAS/Princeton Symplectic seminar                                                                                                     | Dec. 2021                                  |
|               | UMass Boston Colloquium                                                                                                              | Nov. 2021                                  |
|               | IAS workshop, "The h-principle and beyond"                                                                                           | Nov. 2021                                  |
|               | Symplectic semester conference at Institut Henri Poincaré                                                                            | July 2021,<br>Cancelled due to<br>Covid-19 |

| Boston University Geometry and Physics seminar (online)                                          | April 2021                                 |
|--------------------------------------------------------------------------------------------------|--------------------------------------------|
| Dutch Differential Topology and Geometry seminar, 2 talks (online)                               | April 2021                                 |
| Symplectic Zoominar, CRM-Montréal, Princeton/IAS, Tel Aviv, and Paris (online)                   | March 2021                                 |
| Western Hemisphere Symplectic Geometry seminar (online)                                          | May 2020                                   |
| Stony Brook University Symplectic Geometry seminar                                               | May 2020<br>Cancelled due to<br>Covid-19   |
| IAS Emerging Topics workshop on Hypersurfaces in Contact Geometry                                | March 2020<br>Cancelled due to<br>Covid-19 |
| University of Massachusetts, Boston, Colloquium                                                  | March 2020                                 |
| University of South California, Colloquium                                                       | Feb. 2020                                  |
| MIT Geometry and Topology seminar                                                                | Dec. 2019                                  |
| Conference on homological algebra, microlocal analysis and<br>symplectic geometry, CRM Montreal  | June 2019                                  |
| IAS/Princeton Symplectic Geometry Seminar                                                        | April 2019                                 |
| Northwestern Geometry and Physics Seminar                                                        | Feb. 2019                                  |
| PATCH Seminar<br>Philadelphia area seminar: Bryn Mawr, Haverford, Penn, Temple                   | Feb. 2019                                  |
| Georgia Tech Geometry Topology Seminar                                                           | Dec. 2018                                  |
| Workshop on Legendrian submanifolds<br>UQAM Montreal                                             | Nov. 2018                                  |
| Stony Brook topology and symplectic geometry seminar                                             | Oct. 2018                                  |
| Conference on geometric methods in symplectic and contact topology                               | Aug. 2018                                  |
| Workshop on symplectic geometry and its interactions with<br>low-dimensional topology, Princeton | June 2018                                  |
| Gokova Geometry Topology Conference                                                              | May 2018                                   |
| Nantes symplectic seminar                                                                        | Jan. 2018                                  |
| Berlin-Hamburg symplectic seminar                                                                | Jan. 2018                                  |
| XII Workshop on Symplectic Geometry, Contact Geometry,<br>and Interactions, Uppsala              | Jan. 2018                                  |
| Berkeley Topology Seminar                                                                        | Nov. 2017                                  |
| MIT Geometry and Topology Seminar                                                                | May 2017                                   |
| Joint Los Angeles Topology Seminar                                                               | April 2017                                 |
| Columbia Symplectic Geometry, Gauge Theory, and<br>Categorification Seminar                      | Dec. 2016                                  |

|          | IAS/Princeton Symplectic Geometry Seminar                                                  | Dec. 2016   |
|----------|--------------------------------------------------------------------------------------------|-------------|
|          | Stanford Symplectic Geometry Seminar                                                       | Nov. 2016   |
|          | Northern California Symplectic Geometry Seminar<br>Joint between Berkeley and Stanford     | Dec. 2015   |
|          | Combinatorial and Additive Number Theory Conference<br>CUNY                                | May 2012    |
|          | Joint Mathematics Meetings<br>Boston                                                       | Jan. 2012   |
|          | Maine/Quebec Number Theory Conference<br>University of Maine                               | Nov. 2011   |
|          | Young Mathematicians Conference<br>Ohio State University                                   | Aug. 2011   |
|          | Shenandoah Undergraduate Mathematics and Statistics Conference<br>James Madison University | Sept. 2010  |
| TEACHING | General topology (Math 440), Instructor, UMass Boston                                      | Spring 2024 |
|          | Calculus 2 (Math 141), two sections, Instructor, UMass Boston                              | Fall 2023   |
|          | General topology (Math 440), Instructor, UMass Boston                                      | Spring 2023 |
|          | Complex Analysis with applications (Math 358), Instructor, UMass Boston                    | Fall 2022   |
|          | Calculus 2 (Math 141), Instructor, UMass Boston                                            | Fall 2022   |
|          | Calculus 2 (Math 141), Instructor, UMass Boston                                            | Spring 2022 |
|          | Calculus 1 (Math 140), Instructor, UMass Boston                                            | Fall 2021   |
|          | Undergraduate algebraic topology (Math 4053), Instructor, Columbia                         | Spring 2020 |
|          | Differential Equations (Math 2030), Instructor, Columbia                                   | Fall 2018   |
|          | Honors Differential Equations (Math 53H), Teaching Assistant, Stanford                     | Spring 2016 |
|          | Introductory Calculus (Math 19), Course Assistant, Stanford                                | Fall 2015   |
|          | Differential Equations (Math 53), Teaching Assistant, Stanford                             | Spring 2014 |
|          | Graduate Complex Analysis (Math 215A), Course Assistant, Stanford                          | Fall 2013   |
|          | Honors Linear Algebra (Math 217), Course Assistant, Princeton                              | Spring 2011 |

| SERVICE AND | Mentoring:                                                                                                                                                                                      |                        |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| OUTREACH    | Independent study mentor for Thomas Tran                                                                                                                                                        | Nov 2023-              |
|             | Organized panel for UMass Boston undergraduates about grad school in math/computational biology; Guest: Thomas Fai and Sarah Dennis                                                             | April 2024             |
|             | Organized panel for UMass Boston undergraduates about grad school;<br>Guest: Kourosh Zarringhalam                                                                                               | Oct 2023               |
|             | Senior thesis advisor for Jack Pierce<br>Thesis title: "Constrained motion spaces of robotic arms"                                                                                              | June 2022 - 2023       |
|             | Academic advisor for 12 UMass Boston math major undergrads                                                                                                                                      | Fall 2022-             |
|             | Symplectic and contact geometry early-career workshop mentor<br>Mentor for group of five grad students and postdocs;<br>led afternoon research session and career panelist                      | Aug 2022 -             |
|             | Stanford Math Directed Reading Program mentor<br>Guided Stanford undergrad through Milnor's "Morse theory"<br>during the spring quarter                                                         | Spring 2017            |
|             | Stanford Undergraduate Research in Mathematics, co-advisor<br>Co-advised three Stanford undergrads for ten week research on<br>"Mapping class groups and four-dimensional Lefschetz fibrations" | Summer 2016            |
|             | First year graduate student mentor                                                                                                                                                              | 2014-2015              |
|             | Summer Institute for Mathematics, University of Washington, counselor<br>Math camp for high-school students                                                                                     | Summer 2009            |
|             | Outreach and community service:                                                                                                                                                                 |                        |
|             | Math graduate school panel organizer, UMass Boston                                                                                                                                              | 2023-                  |
|             | UMass Boston Welcome day, Math Department representative                                                                                                                                        | March 2024             |
|             | UMass Boston Open House, Math Department representative                                                                                                                                         | April. 2023            |
|             | Judge for SIMIODE, differential equations modelling competition                                                                                                                                 | Nov. 2022, Nov<br>2023 |
|             | UMass Boston Open House, Math Department representative                                                                                                                                         | Sept. 2022             |
|             | UMass Boston Welcome day, Math Department representative                                                                                                                                        | Feb. 2022              |
|             | UMass Boston undergraduate math club<br>Worked on math problems and riddles with students<br>gave interview about life in mathematics                                                           | Sept. 2021             |
|             | Columbia Undergraduate Math Society, 2 talks                                                                                                                                                    | April, Oct. 2019       |
|             | Columbia graduate student colloquium talk                                                                                                                                                       | Feb. 2019              |
|             | SPLASH talk for high-school students, Stanford                                                                                                                                                  | April 2016             |

## Seminar organizing:

| UMass Boston math department seminar, co-organizer                                         | Fall 2022-  |
|--------------------------------------------------------------------------------------------|-------------|
| Harvard/MIT outdoor symplectic seminar, co-organizer                                       | Spring 2021 |
| Columbia Symplectic Geometry, Gauge Theory, and Categorification Seminar, co-organizer     | 2017-2020   |
| Stanford Student Symplectic Seminar, organizer                                             | 2015-2016   |
| Stanford Kiddie Seminar for first year graduate students, co-organizer                     | 2013-2014   |
| Conference organizing:                                                                     |             |
| Kylerec workshop co-organizer<br>Five day graduate student workshop on symplectic fillings | Spring 2017 |

## Reviewing and professional service

Wrote Yasha Eliashberg tribute for "Celebratio Mathematica," September 2024

Referee for Geometry and Topology, Journal of Topology, Inventiones mathematicae, Journal of Symplectic Geometry, Compositio Mathematica, International Mathematics Research Notices, Communications in Analysis and Geometry, Advances in Mathematics, Mathematische Annalen, Selecta

-9 referee reports and quick opinions academic year 2021-2022

Review writer for MathSciNet

## University service:

| Curriculum committee, UMass Boston Department of Mathematics                                 | Sept. 2024-            |
|----------------------------------------------------------------------------------------------|------------------------|
| Personnel committee, UMass Boston Department of Mathematics                                  | Sept. 2023-            |
| Math Grad Program committee, UMB Math Department<br>cowrote syllabi for two proposed courses | Sept. 2023-            |
| Recruitment committee, UMass Boston Department of Mathematics                                | Sept. 2022-            |
| College of Sciences and Mathematics faculty senator, UMass Boston                            | Nov. 2021- Dec<br>2023 |