

CURRICULUM VITAE
Sergey Dyachenko, PhD
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EDUCATION

Ph.D. , Mathematics	U of New Mexico, Albuquerque, NM	2007-2014
B.S. , Applied Physics & Mathematics	PhysTech, Dolgoprudny, Moscow, Russia	2003-2006

DISSERTATION

Strongly nonlinear phenomena and singularities in optical, hydrodynamic & biological systems
The dissertation explores blowing-up solutions of nonlinear systems described by PDEs. When the spatial coordinate is made complex, the dynamics of complex singularities in the analytic continuation are studied to provide valuable insights into the underlying physics.

Advisors:

Pavel M. Lushnikov¹ & Alexander O. Korotkevich^{1,2}

¹ U of New Mexico, ² Landau Institute for Theoretical Physics

RESEARCH EXPERIENCE

Tenure-track	Assistant Professor	2020-
Postdoctoral	Acting Assistant Professor with Dr. Bernard Deconinck	2019-2020
	J. L. Doob Research Professor with Dr. Vera Mikyoung Hur	2015-2019
	Visiting Assistant Professor with Dr. Vladimir E. Zakharov	2014-2015
Other Programs	Scientist with Dr. Gregory Falkovich at Weizmann Institute, IL	2023
	Visiting Researcher at Newton Institute in Cambridge, UK	2022
	ICERM Postdoctoral Fellow with Dr. Vera Mikyoung Hur	2016-2017
	Summer Internship with Dr. Misha Chertkov at LANL	2014
	Junior Research Scientist at New Mexico Consortium	2009-2013

GRANTS

PI & Allocation Manager	Explore ACCESS PHY230041	2023-
Principal Investigator	NSF DMS-1716822 \$127,599	2017-2020

TEACHING EXPERIENCE

SUNY at Buffalo

Survey Partial Differential Equations	(crosslist)
Numerical Analysis	(crosslist)
Linear Algebra	(undergrad)
Differential Equations	(undergrad)

U of Washington

Intro to Partial Differential Equations	(crosslist)
Complex Analysis & Vector Calculus	(crosslist)

U of Illinois UC

Intro to Partial Differential Equations [†]	(crosslist)
Applied Linear Algebra	(undergrad)
Differential Equations	(crosslist)
Intro to Differential Equations Plus	(undergrad)

U of Arizona

Linear Algebra	(undergrad)
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SUPERVISORY AND MENTORING EXPERIENCE

Postdoctoral

Mentorship program that has led to the publication of two printed works and another publication currently undergoing revision	2020-
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Graduate

Provided guidance and supervision to a master's student from an underrepresented minority background at the University of Washington	2019-2021
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ACADEMIC SERVICE

Reviewer

European Journal of Mechanics / B Fluids
 Journal of Fluid Mechanics
 Fluid Mechanics Research
 The European Physical Journal Plus

Committee

Graduate Studies Committee	2020-
Applied Math Seminar Organizer	2022
Search Committee	2021

Session Organizer

Fall 2023 AMS Sectional Meeting	2023
The 13th AIMS Conference on Dynamical Systems	2023
The 12th IMACS International Conference on Nonlinear Evolution Equations	2022
SIAM Annual Meeting	2021
The 11th IMACS International Conference on Nonlinear Evolution Equations	2021
SIAM Conference on Nonlinear Waves and Coherent Structures	2018
The 11th AIMS Conference on Dynamical Systems	2016

[†]designates selection for the List of Teachers Ranked as Excellent by Their Students.

AWARDS AND HONORS

Teachers Ranked as Excellent	U of Illinois Urbana-Champaign	2016
Outstanding Student Award in Applied Mathematics	U of New Mexico	2014
Selection for <i>Nonlinearity</i> 2013 Highlights Collection		2013

MEDIA COVERAGE

News article, *Oceanic waves represent fundamental challenges in nonlinear science*, highlighting the importance of the publication doi.org/10.1073/pnas.2308935120.

LIST OF SCIENTIFIC PUBLICATIONS

In Press

23. **Dyachenko, S.** and Semenova, A., *Quasiperiodic perturbations of Stokes waves: Secondary bifurcations and stability*, Journal of Computational Physics, 492, 112411, doi:10.1016/j.jcp.2023.112411 2023
22. Deconinck, B., **Dyachenko, S.A.**, Lushnikov, P.M. and Semenova, A., *The dominant instability of near-extreme Stokes waves[‡]*, Proceedings of National Academy of Sciences, vol. 120(32), e2308935120, doi:10.1073/pnas.2308935120 2023
21. **Dyachenko, S.**, Vera Mikyoung Hur and Silantyev, D., *Almost extreme waves*, Journal of Fluid Mechanics, 955, A17, doi:10.1017/jfm.2022.1047 2023
20. Korotkevich, A.O., Lushnikov, P.M., Semenova, A., **Dyachenko, S.**, *Superharmonic Instability of Stokes Waves*, Studies in Applied Mathematics, 119-134, doi:10.1111/sapm.12535 2023
19. **Dyachenko, S. A.** and Semenova, A., *Canonical conformal variables based method for stability of Stokes waves*, Studies in Applied Mathematics, 1-11, doi:10.1111/sapm.12554 2022
18. Dyachenko, A., **Dyachenko, S.** and Zakharov, V., *Free surface in two-dimensional potential flow: Singularities, invariants and virtual fluid*, Journal of Fluid Mechanics, 952, A30, doi:10.1017/jfm.2022.911 2022
17. Dyachenko, A., **Dyachenko, S.**, Lushnikov, P. M and Zakharov, V. E., *Short branch cut approximation in two-dimensional hydrodynamics with free surface*, Proc. Roy. Soc. A 477(2249): 20200811, doi.org/10.1098/rspa.2020.0811 2021
16. Semenova, A., **Dyachenko, S. A.**, Korotkevich, A. O., Lushnikov, P. M., *Comparison of split-step and Hamiltonian integration methods for simulation of the nonlinear Schrödinger type equations*, Journal of Computational Physics, 427:110061, doi.org/10.1016/j.jcp.2020.110061 2021
15. **Dyachenko, S. A.**, *Traveling capillary waves on the boundary of a fluid disc*, Studies in Applied Mathematics, 148:125-140, doi.org/10.1111/sapm.12435 2021
14. **Dyachenko, S. A.** *On the dynamics of a free surface of an ideal fluid in a bounded domain in the presence of surface tension*, Journal of Fluid Mechanics, 860:408–418, doi.org/10.1017/jfm.2018.885 2019

[‡]The study is covered in U of New Mexico Newsroom (media link).

13. **Dyachenko, S.** and Vera Mikiyoung Hur, *Stokes Waves with Vorticity: Folds, Gaps and Fluid Bubbles*, Journal of Fluid Mechanics, 878:502–521, doi.org/10.1017/jfm.2019.634 2019
12. **Dyachenko, S.** and Vera Mikiyoung Hur, *Stokes Waves with Vorticity I: Numerical Computation.*, Studies in Applied Mathematics, 142:162–189, doi.org/10.1111/sapm.12250 2019
11. Dyachenko, A., **Dyachenko, S.**, Lushnikov, P.M., and Zakharov, V.E., *Dynamics of Poles in 2D Hydrodynamics with Free Surface: New Constants of Motion*, Journal of Fluid Mechanics, 874:891–925, doi.org/10.1017/jfm.2019.448 2019
10. Lushnikov, P.M., **Dyachenko, S.**, Silantyev, D.A., *New Conformal Mapping for Adaptive Resolving of the Complex Singularities of Stokes Wave*, Proceedings of Royal Society A, 473(2202):20170198, doi.org/10.1098/rspa.2017.0198 2017
9. **Dyachenko, S.**, Zlotnik, A., Korotkevich, A.O., Chertkov, M., *Operator Splitting Method for Dynamic Simulations of Flows in Natural Gas Transport Networks.*, Physica D, 361:1-11, doi.org/10.1016/j.physd.2017.09.002 2017
8. **Dyachenko S.**, Zakharov, D.V., Zakharov, V.E., *Primitive potentials and bounded solutions of the KdV equation.*, Physica D, 333:148–156, doi.org/10.1016/j.physd.2016.04.002 2016
7. Zakharov, D.V., **Dyachenko, S.**, Zakharov, V.E., *Bounded solutions of KdV and non-periodic one-gap potentials in quantum mechanics*, Letters in Mathematical Physics, 106:731–740, doi.org/10.1007/s11005-016-0838-6 2016
6. Zakharov, D.V., Zakharov, V.E., **Dyachenko S.**, *Non-periodic one-dimensional ideal conductors and integrable turbulence*, Physics Letters A, 380(46):3881–3885, doi.org/10.1016/j.physleta.2016.09.040 2016
5. **Dyachenko S.** and Newell, A.C., *Whitcapping*, Studies in Applied Mathematics, 137:199–213, doi.org/10.1111/sapm/12126 2016
4. **Dyachenko S.**, Lushnikov, P.M. and Korotkevich, A.O., *Branch cuts of Stokes wave on deep water. Part I: Numerical solution and Padé approximation*, Studies in Applied Mathematics, 137:419–472, doi.org/10.1111/sapm/12128 2016
3. **Dyachenko, S.**, Lushnikov, P.M. and Korotkevich, A.O., *Complex Singularity of a Stokes wave*, JETP Letters, 98(11):675–679, doi.org/10.1134/S0021364013240077 2014
2. Lushnikov, P.M., **Dyachenko, S.** and Vladimirova, N., *Beyond leading-order logarithmic scaling in the catastrophic self-focusing of a laser beam in Kerr media*, Physical Review A, 88:013845, doi.org/10.1103/PhysRevA.88.013845 2013
1. **Dyachenko, S.**, Lushnikov, P.M. and Vladimirova N., *Logarithmic scaling of the collapse in the critical Keller-Segel equation[§]*, Nonlinearity, 26(11):3011–3041, doi.org/10.1088/0951-7715/26/11/3011 2013

[§]The article was selected for Nonlinearity 2013 Highlights Collection

Book Chapters and Refereed Conference Proceedings

5. Ludu, A., Dynamics of Two-Dimensional Fluid in Bounded Domain via Conformal Variables (A. Chernyavsky and **S. Dyachenko**). In *Nonlinear Waves and Solitons on Contours and Closed Surfaces* (pp. 355-370). Cham: Springer International Publishing. 2022
4. **S. Dyachenko**, P. Nabelek, D. Zakharov and V. Zakharov, *Primitive Solutions of the Korteweg–de–Vries Equation*, Yaroslavl Conference Proceedings 2019
3. **S. Dyachenko** and Vera Mikyoung Hur, *Stokes waves over a constant vorticity flow*, *Tutorials, Schools, and Workshops in the Math. Sciences*, Springer 2019
2. A. Zlotnik, **S. Dyachenko**, S. Backhaus, M. Chertkov, *Model Reduction and Optimization of Natural Gas Pipeline Dynamics*, ASME DSCC2015-9683 2015
1. **S. Dyachenko**, P.M. Lushnikov and N. Vladimirova. *Logarithmic-type Scaling of the Collapse of Keller-Segel Equation*. AIP Conf. Proc., 1389, 709–712 2011

Under Revision

- Chernyavsky, A. and Dyachenko, S., *Dynamics of 2D fluid in bounded domain via conformal variables*, *Studies in Applied Mathematics*, arxiv.org/abs/2205.02349 2023

In preparation

- Deconinck B., Dyachenko, S. and Semenova, A., *Recurrence of Benjamin-Feir and localized instabilities in Almost Limiting Stokes Waves* 2023

PRESENTATIONS**Seminars and Colloquia**

2023	UW Applied Math Seminar	U of Washington
2023	Applied Math Seminar	Northumbria U
2022	UW Applied PDE Seminar	U of Washington
2021	Applied Math Seminar	U of New Mexico
2020	Applied Math Seminar	SUNY at Buffalo
2019	Applied Math Seminar	U of Colorado-CS
2019	Special Seminar	UNC Chapel Hill
2018	Applied Math Seminar	U of Houston
2018	Nonlinear Waves Seminar	U of Colorado-Boulder
2018	Analysis and Applied Math	U of Illinois Chicago
2017	Fluids Seminar, PACM	Princeton U
2017	J. L. Doob Colloquium	U of Illinois UC
2017	“Water Waves” workshop	ICERM at Brown U
2016	Mathematical Sciences Colloquium	RPI
2016	Applied PDE Seminar	U of Washington
2014	Analysis, Dynamics and Applications	U of Arizona
2013	Applied Math Seminar	U of New Mexico

Invited talks

2023	Fall 2023 AMS Sectional Meeting, Buffalo, NY
2023	SRITP: Solitons, Collapses and Turbulence, Weizmann Institute
2023	13th AIMS Conference, Wilmington, NC
2022	Isaac Newton Institute, Cambridge, UK
2022	Colorado Nonlinear Days
2022	The 12th IMACS International Conference
2021	AMS South Eastern Sectional Meeting
2021	AMS Fall Western Sectional Meeting
2021	Analytical and Numerical Methods in Differential Equations
2021	2021 SIAM Annual Meeting
2021	2021 SIAM SIAM Conference on Dynamical Systems
2019	2nd Biennial Meeting of SIAM Pacific Northwest Section
2019	The 11th IMACS International Conference
2018	SIAM Conference on Nonlinear Waves and Coherent Structures
2017	The 10th IMACS International Conference
2016	The 11th AIMS Conference
2016	Midwestern Workshop on Asymptotic Analysis
2016	SIAM Conference on Nonlinear Waves and Coherent Structures
2015	Texas Analysis and Mathematical Physics Symposium
2015	The 9th IMACS Conference on Nonlinear Waves
2014	Texas Analysis and Mathematical Physics Symposium
2014	AMS Sectional Meeting
2013	AMS Sectional Meeting
2013	The 8th IMACS Conference on Nonlinear Waves
2012	AMS Sectional Meeting
2012	SIAM Conference on Nonlinear Waves and Coherent Structures
2011	Workshop on Recent Progress of Waves Processes in Nature

(COMPUTER) LANGUAGES

C for High Performance Computing, Matlab, Mathematica, Python
 English, Russian (native)