

# Hengrong Du

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CONTACT INFORMATION	Department of Mathematics Vanderbilt University	Phone: +1 615 322 6668 E-mail: <a href="mailto:hengrong.du@vanderbilt.edu">hengrong.du@vanderbilt.edu</a>
RESEARCH INTERESTS	Partial differential equations, geometric measure theory, calculus of variations, stochastic analysis, fluid dynamics, and machine learning	
ACADEMIC POSITIONS	<b>Vanderbilt University</b> , Nashville, TN, USA Postdoc Scholar (Research), <b>Department of Mathematics</b> Mentor: <b>Dr. Gieri Simonett</b>	Sep. 2021-Aug. 2024
EDUCATION	<b>Purdue University</b> , West Lafayette, IN Ph.D., Mathematics Advisor: <b>Dr. Changyou Wang</b>	Aug. 2016-Aug. 2021
	<b>Beijing Normal University</b> , Beijing, China M.S., Computational Mathematics Advisor: <b>Dr. Jiequan Li</b>	Sep. 2013-July 2016
	<b>South China Normal University</b> , Guangzhou, China B.S., Mathematics and Applied Mathematics	Sep. 2009-July 2013
PUBLICATIONS	<ol style="list-style-type: none"><li>1. Wei Deng, Yu Chen, Nicole Tianjiao Yang, Hengrong Du, Qi Feng and Ricky T. Q. Chen. <i>On convergence of approximate Schrödinger bridge with bounded cost</i>. ICML Workshop on New Frontiers in Learning, Control, and Dynamical Systems (2023).</li><li>2. Hengrong Du, Nung Kwan Yip. <i>Stability of self-similar solutions to geometric flows</i>. Interfaces Free Bound. 25 (2023), no. 2, 155–191.</li><li>3. Hengrong Du, Qinfeng Li, Changyou Wang. <i>Compactness of <math>M</math>-uniform domains and optimal thermal insulation problems</i>. Adv. Calc. Var. 16 (2023), no. 1, 17-43.</li><li>4. Hengrong Du, Yuanzhen Shao, Gieri Simonett. <i>Well-posedness for magneto-viscoelastic fluids in 3D</i>. Nonlinear Anal. Real World Appl. 69 (2023), no. 103759.</li><li>5. Hengrong Du, Tao Huang, Changyou Wang. <i>Weak compactness property of simplified nematic liquid crystal flows in dimension two</i>. Math. Z. 302 (2022), no. 2, 2111-2130.</li><li>6. Hengrong Du, Changyou Wang. <i>Global weak solutions to the stochastic Ericksen–Leslie system in dimension two</i>. Discrete Contin. Dyn. Syst. 42 (2022), no. 5, 2175-2197.</li></ol>	

7. Hengrong Du, Changyou Wang. *Partial regularity of a nematic liquid crystal model with kinematic transport effects*. Nonlinearity 34 (2021), no. 5, 3001-3045.
8. Hengrong Du, Yimei Li, Changyou Wang. *Weak solutions of non-isothermal nematic liquid crystal flow in dimension three*. J. Elliptic Parabol. Equ. 6 (2020), no. 1, 71-98.
9. Hengrong Du, Xianpeng Hu, Changyou Wang. *Suitable Weak Solutions for the Co-rotational Beris–Edwards System in Dimension Three*. Arch. Ration. Mech. Anal. 238 (2020), no. 2, 749-803.

#### ONGOING WORK

1. Hengrong Du, Yuanzhen Shao, Gieri Simonett. *On a thermodynamically consistent model for magnetoviscoelastic fluids in 3D*, [arXiv:2305.13432](https://arxiv.org/abs/2305.13432).
2. Hengrong Du, Tao Huang, Changyou Wang. *Heat flow of  $s$ -harmonic maps to spheres*, in preparation.
3. Hengrong Du, Chuntian Wang. *Partial regularity of the stochastic Ericksen–Leslie system in 3D*, in preparation.
4. Hengrong Du, Seongmin Jeon. *On the inhomogeneous parabolic boundary Harnack principle*, in preparation.

#### AWARDS

- Bilsland Dissertation Fellowship June 2020-May 2021  
It is intended to give the most accomplished final-year PhD candidates an opportunity to complete the dissertation within the 2020–21 academic year by devoting full-time effort to research and writing.

#### TALKS

- AMS Special Section on Dynamics and Regularity of PDEs  
Joint Mathematics Meeting (upcoming) January 2024
- Seminar on Analysis and Stochastic Analysis  
Auburn University (upcoming) November 2023
- PDE Seminar  
Tennessee of Tennessee, Knoxville (upcoming) October 2023
- PDE/Applied Math Semin  
Indiana University Bloomington (upcoming) October 2023
- Richard F. Barry Jr. Seminar  
Old Dominion University September 2023
- The 13th AIMS Conference  
University of North Carolina Wilmington June 2023
- AMS Spring Central Sectional Meeting  
University of Cincinnati April 2023

	<ul style="list-style-type: none"> <li>• Undergraduate Seminar in Mathematics Vanderbilt University</li> </ul>	March 2023
	<ul style="list-style-type: none"> <li>• Analysis Seminar Wayne State University</li> </ul>	March 2023
	<ul style="list-style-type: none"> <li>• 3rd Biennial Meeting of SIAM Pacific Northwest Section Washington State University</li> </ul>	May 2022
	<ul style="list-style-type: none"> <li>• AMS Spring Central Virtual Sectional Meeting Purdue University</li> </ul>	March 2022
	<ul style="list-style-type: none"> <li>• Graduate Online Mini-course Beijing Normal University</li> </ul>	November 2021
	<ul style="list-style-type: none"> <li>• PDE Seminar Fall 2021 Vanderbilt University</li> </ul>	September 2021
	<ul style="list-style-type: none"> <li>• Analysis Seminar The University of Alabama</li> </ul>	February 2021
	<ul style="list-style-type: none"> <li>• PDE Seminar Purdue University</li> </ul>	September 2020
	<ul style="list-style-type: none"> <li>• Student Analysis Seminar Purdue University</li> </ul>	February 2020
	<ul style="list-style-type: none"> <li>• Student Analysis Seminar Purdue University</li> </ul>	February 2020
	<ul style="list-style-type: none"> <li>• PDE Seminar Purdue University</li> </ul>	January 2020
CONFERENCE PARTICIPATION	<ul style="list-style-type: none"> <li>• Rivière-Fabes Symposium on Analysis and PDE University of Minnesota</li> </ul>	Apr. 19-21, 2023
	<ul style="list-style-type: none"> <li>• Shanks Workshop on Advances in Mathematical and Theoretical Biology Vanderbilt University</li> </ul>	Mar. 17-19, 2023
	<ul style="list-style-type: none"> <li>• Workshop on Geometry and Analysis of Fluid Flows Stony Brook University</li> </ul>	Jan. 16-20, 2023
	<ul style="list-style-type: none"> <li>• AMS Fall Central Sectional Meeting University of Texas at El Paso</li> </ul>	Sep. 17-18, 2022
	<ul style="list-style-type: none"> <li>• Shanks Workshop on Mathematical Aspect of Fluid Dynamics Vanderbilt University</li> </ul>	Feb. 19-20, 2022
	<ul style="list-style-type: none"> <li>• KUMUNU-ISU Conference on PDE, Dynamical Systems, and Applications University of Nebraska-Lincoln</li> </ul>	Oct. 23-24, 2021
	<ul style="list-style-type: none"> <li>• AMS Fall Western Sectional Meeting Online</li> </ul>	Oct. 23-24, 2021
	<ul style="list-style-type: none"> <li>• The 84th Midwest PDE Seminar Illinois Institute of Technology</li> </ul>	Oct. 26-27, 2019
	<ul style="list-style-type: none"> <li>• Midwest Geometry Conference 2019 Iowa State University</li> </ul>	Sept. 6-8, 2019
	<ul style="list-style-type: none"> <li>• The 83rd Midwest PDE Seminar Indiana University Bloomington</li> </ul>	Mar. 30-31, 2019

TEACHING EXPERIENCE	Instructor at Vanderbilt University	Fall 2021-Present
	• MATH 2400 Differential Equations with Linear Algebra	Fall 2023
	• MATH 3100 Introduction to Analysis	Spring 2023
	• MATH 3100 Introduction to Analysis	Fall 2022
	• MATH 1301 Accelerated Single-Variable Calculus II	Fall 2022
	• MATH 2420 Methods of Ordinary Differential Equations	Spring 2022
	• MATH 2400 Differential Equations with Linear Algebra	Spring 2022
	Recitation Instructor at Purdue University	Fall 2016-Summer 2021
	• MA 26200 Linear Algebra And Differential Equations	Fall 2019
	• MA 16200 Plane Analytic Geometry And Calculus II	Spring 2019
	• MA 16500 Plane Analytic Geometry And Calculus I	Fall 2018