

Personal Details

- Name: Dr. Vandita Sharma
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Educational Qualifications

- Doctor of Philosophy (Ph.D.): 2015 - 2020, Mathematics, Indian Institute of Technology Ropar.
- Master of Science (M.Sc.): 2011- 2013, Mathematics (Gold Medallist), Guru Nanak Dev University, Amritsar, Punjab, India.
- Bachelor of Science (B.Sc.): 2008- 2011, Computer Science (Merit holder), Guru Nanak Dev University, Amritsar, Punjab, India.

Research interest

- Mathematical modelling and simulation of reaction-diffusion process.
- Numerical methods (Finite difference, Spectral methods, Finite element method) for solving partial differential equations.
- Computational fluid dynamics.
- Hydrodynamic instability.

Publications

Journal Publications:

1. Verma, P., **Sharma, V.**, and Mishra, M., Radial Viscous fingering induced by an infinitely fast chemical reaction, *accepted, Journal of Fluid Mechanics*. (Impact factor: 3.627).
2. **Sharma, V.**, Othman, H.B., Nagatsu, Y., and Mishra, M., Viscous fingering of miscible annular ring, *Journal of Fluid Mechanics*, 2021, 916, A14. (Impact factor: 3.627).
3. Kim, M., Pramanik, S., **Sharma, V.** and Mishra, M., Unstable miscible displacements in radial flow with chemical reactions, *Journal of Fluid Mechanics*, 2021, 917, A25. (Impact factor: 3.627).
4. **Sharma, V.**, Nand, S., Pramanik, S., Chen C.Y., and Mishra, M., Control of radial miscible viscous fingering, *Journal of Fluid Mechanics*, 2020, 884, A16. (Impact factor: 3.627).
5. **Sharma, V.**, Pramanik, S., Chen C.Y., and Mishra, M., A numerical study on reactioninduced radial fingering instability, *Journal of Fluid Mechanics*, 2019, 862, 624-638. (Impact factor: 3.627).
6. **Sharma, V.**, Pramanik, S. and Mishra, M., (2017), Dynamics of a highly viscous circular blob in homogeneous porous media, *Fluids*, 2017, 2(2), 32.

Conference Proceedings/ Abstracts:

1. **Sharma V**, Mishra M, Understanding Reactive Flows in Porous Medium: A Numerical Approach, **APS DFD 2021** (online).
2. Verma P, **Sharma V**, Mishra M, A Numerical Study of Reactive Radial Viscous Fingering, 18th International Conference on Flow Dynamics (**ICFD2021**) (online).

3. Verma P, **Sharma V**, Mishra M, Numerical simulations of radial viscous fingering Induced by an Instantaneous Chemical Reaction, **APS DFD 2021** (online).
4. Verma P, **Sharma V**, Mishra M, Fingering Dynamics in an Infinitely Fast Chemical Front in a Porous Medium, **AGU Fall meeting 2021** (online).
5. **Sharma, V.**, Nagatsu, Y., and Mishra, M., Miscible radial viscous fingering with finiteness, *International Congress of Theoretical and Applied Mechanics (ICTAM)*, 2227 August, 2021, Milano (online).
6. Nand S, **Sharma V**, Ali N, Mahendia V, Mishra M, An Experimental and Numerical insight into Diffusive Zones in Radial Miscible Viscous Fingering, **APS DFD 2021** (online).
7. Nand S, **Sharma V**, Ali N, Mahendia V, Mishra M, Effects of Diffusion in Viscous Fingering Instabilities in Porous Medium Flows, **AGU Fall meeting 2021** (online).
8. **Sharma, V.**, and Mishra, M., Hybrid Numerical Scheme for Reactive Flows with Singularity, *The Second Joint SIAM/CAIMS Annual Meeting (AN20)*, July 6-10, 2020, co-located with the **SIAM** Conference on Imaging Science (IS20), Toronto, Ontario, Canada.
9. **Sharma, V.**, Chen, C. Y., and Mishra, M., A Control strategy for Radial Miscible Viscous Fingering: Non Linear Simulations, 72nd Annual meeting of the American Physical Society Division of Fluid Dynamics (**APS-DFD**), Seattle, November 23-26, 2019.
10. **Sharma, V.**, Pramanik, S., Chen, C. Y., and Mishra, M., Numerical insight into reaction driven fingering instability, Sixteenth International Conference on Flow Dynamics (**ICFD**), Sendai, Miyagi, Japan, November 6 - 8 2019.
11. **Sharma, V.**, and Mishra, M., Onset to shutdown of radial viscous fingering dynamics, 9th International Congress on Industrial and Applied Mathematics- **ICIAM** 2019, July 15-19, 2019, Valencia, Spain.
12. **Sharma, V.**, Pramanik, S., Chen, C. Y., and Mishra, M., Transition to reaction-induced viscous fingering, 71st Annual meeting of the American Physical Society Division of Fluid Dynamics (**APS-DFD**), Atlanta, November 18-20, 2018.
13. **Sharma, V.**, and Mishra, M., A competition between diffusive and convective forces in radial viscous fingering, 12th European Fluid Mechanics Conference (**EFMC**), September 9-13, 2018, Vienna, Austria.
14. **Sharma, V.**, Pramanik, S., Chen, C. Y., and Mishra, M., A numerical study of chemical reaction induced viscous fingers, 12th European Fluid Mechanics Conference (**EFMC**), September 9-13, 2018, Vienna, Austria.
15. **Sharma, V.**, Pramanik, S., and Mishra, M., Fingering instabilities in variable viscosity miscible fluids: radial source flow, COMSOL conference, 2016, Bangalore, India.

Oral Presentations

- Chemical reaction-driven fingering instability, Research conclave 2018, Indian Institute of Technology Ropar, April 21, 2018.
- Dynamics of viscous circular blobs in porous media, International conference on Mathematical modelling and computations in Biosystems, Indian Institute of Technology Roorkee, March 12-14, 2018.

- Fingering instabilities in variable viscosity miscible fluids: radial source flow, COMSOL conference, October 20-21, 2016, Bangalore, India.

Awards/Achievements

- Awarded **ICTAM travel award** to attend the International Congress of Theoretical and Applied Mechanics (ICTAM), 22-27 August, 2021, Milano.
- Selected to receive the **SIAM Student Travel Award** to attend The Second Joint SIAM/CAIMS Annual Meeting (AN20), held from July 6-10, 2020, co-located with the SIAM Conference on Imaging Science (IS20), in Toronto, Ontario, Canada.
- Awarded **ICIAM financial support** program to attend the 9th International Congress on Industrial and Applied Mathematics-ICIAM 2019 from July 15-19, 2019, Valencia, Spain.
- **Second prize** for the poster presented at the Third forum of the Chinese Society of Visualisation, Science and Art, November 21, 2019, Tamsui, Taiwan.
- Received **travel grant** from **CSIR** to attend 12th European Fluid Mechanics Conference, September 9-13, 2018, Vienna, Austria.
- **Best oral presentation** award for the work entitled 'Chemical reaction-driven fingering instability', presented at Research conclave, Indian Institute of Technology Ropar, April 21, 2018.
- Won the **excellent work** award for the poster entitled 'Viscous fingering on an immiscible reactive interface with variation of interfacial tension', presented at the First forum of the Chinese Society of Visualisation, Science and Art, held at St. John's University, Taiwan.
- Selected for the **2017 NCTU Taiwan Elite Internship Program**, from August 1, 2017 to October 1, 2017.
- Cleared HPSET (Himachal Pradesh State Eligibility Test) 2015.
- GATE (Graduate Aptitude Test in Engineering): An all-India examination essential for obtaining financial assistance during Masters Programs and direct Doctoral programs.
 - Cleared GATE 2014
 - All India Rank: 27.
- **Gold medal** in M.Sc. in Mathematics, Guru Nanak Dev University, Amritsar, Punjab, India.
- Merit holder in B.Sc. in Computer Science, Guru Nanak Dev University, Amritsar, Punjab, India.

Extra-Curricular activities

- NCC 'C' & 'B' certificate holder. Sahara Scholarship awardee.
- College Role of Honour awardee, 2013, DAV College, Jalandhar, Punjab, India.

Programming skills

- Equipped with programming languages like C, C++, Fortran and MATLAB.
- Experienced user of the commercial software COMSOL Multiphysics.