

Ruchi Sandilya

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🌐 <https://ruchi-sandilya.github.io/sandilyaruchi/>

Research Interests

Numerical Analysis, Scientific Computing, Fluid Dynamics, Control Theory, Machine Learning, Computational Neuroscience

Research Experience

Nov 2021–Present: Postdoctoral Associate, [Weill Cornell Medicine](#), USA

Jan 2020–Feb 2020: Visiting Researcher, [TIFR Centre for Applicable Mathematics](#), India

Jan 2019–Dec 2019: Postdoctoral Researcher, [Weierstrass Institute Berlin](#), Germany

Aug 2017–Jan 2019: Airbus Postdoctoral Fellow, [TIFR Centre for Applicable Mathematics](#), India

Education

2012–2017: Ph.D. in Applied Mathematics, [Indian Institute of Space Science and Technology](#), India

2008–2010: M.Sc. in Mathematics, [University of Delhi](#), India

2005–2008: B.Sc. in Mathematics, [Banaras Hindu University](#), India

Publications

- [1] Sandilya, R., Lynch, C., Victoria, L., Zebley, B., Buchanan, D. M., Bhati, M.T., Williams, N., Spellman, T., GUNNING, F.M., Liston, C., Grosenick, L. Nonlinearly Controllable Counterfactuals with Diffusion. (Submitted to CVPR, 2025).
- [2] Nkansah, I., Sandilya, R., Gallagher, N., Liston, C. & Grosenick, L. (2024). Generalizing CNNs to graphs with learnable neighborhood quantization. (Accepted) *NeurIPS*.
- [3] Chandrashekar, P., Ramaswamy, M., Raymond, J. P., & Sandilya, R. (2021). Numerical stabilization of the Boussinesq system using boundary feedback control. *Computers & Mathematics with Applications*, 89, 163-183.
- [4] Kumar, S., Oyarzúa, R., Ruiz-Baier, R., & Sandilya, R. (2020). Conservative discontinuous finite volume and mixed schemes for a new four-field formulation in poroelasticity. *ESAIM: Mathematical Modelling and Numerical Analysis*, 54(1), 273-299.
- [5] Sandilya, R., George, R. K., & Kumar, S. (2020). Trajectory controllability of a semilinear parabolic system. *The Journal of Analysis*, 28, 107-115.

- [6] Kumar, S., Ruiz-Baier, R., & Sandilya, R. (2019). Error bounds for discontinuous finite volume discretisations of brinkman optimal control problems. *Journal of Scientific Computing*, 78, 64-93.
- [7] Kumar, S., Ruiz-Baier, R., & Sandilya, R. (2018). Mixed and discontinuous finite volume element schemes for the optimal control of immiscible flow in porous media. *Computers & Mathematics with Applications*, 76(4), 923-937.
- [8] Sandilya, R., & Kumar, S. (2017). A discontinuous interpolated finite volume approximation of semilinear elliptic optimal control problems. *Numerical Methods for Partial Differential Equations*, 33(6), 2090-2113.
- [9] Kumar, S., Ruiz-Baier, R., & Sandilya, R. (2017, May). Discontinuous finite volume element methods for the optimal control of Brinkman equations. In *International Conference on Finite Volumes for Complex Applications* (pp. 307-315). Cham: Springer International Publishing.
- [10] Sandilya, R., & Kumar, S. (2016). Convergence of discontinuous finite volume discretizations for a semilinear hyperbolic optimal control problem. *Int. J. Numer. Anal. Model*, 13(6), 926-950.
- [11] Sandilya, R., & Kumar, S. (2016). On discontinuous finite volume approximations for semilinear parabolic optimal control problems. *International Journal of Numerical Analysis & Modeling*, 13(4).
- [12] Sandilya, R., & Kumar, S. (2016). Convergence analysis of discontinuous finite volume methods for elliptic optimal control problems. *International Journal of Computational Methods*, 13(02), 1640012.
- [13] Sandilya, R., & Kumar, S. (2015). Discontinuous finite volume methods for parabolic optimal control problems. *Mathematical Sciences International Research Journal*, 4(2), ISSN 2278-8697, 15-22.
- [14] Sandilya, R., & Kumar, S. (2014). Discontinuous Galerkin finite volume element methods for elliptic optimal control problems. Proceedings of *International Conference on Computational Methods*, ISSN 2374-3948, 41-49.

Programming Skills

- Languages: MATLAB, Python, C, FreeFem++, HTML
- Libraries: PyTorch, NumPy, FEniCS, DOLFIN, Gmsh, MNE-Python, SimNIBS, NiBabel, Nilearn
- Visualization: VisIt, ParaView, Matplotlib, FreeSurfer
- OS: Linux, macOS, Windows
- Version control: GitHub, Bitbucket
- Productivity: LaTeX, Microsoft PowerPoint, Ipe, Jupyter

Fellowships and Awards

- Airbus Postdoctoral Fellowship
- CSIR-UGC Junior Research Fellowship
- NBHM Postdoctoral Fellowship
- SERB International Travel Award

Manuscript Reviews

Journal of Scientific Computing, Mathematical Reviews/MathSciNet

Seminar Talks/Conference Presentations

Nov 2023: Seminar on “Integrable Systems & Nonlinear Mechanics”, TAMUCC, Texas, USA
Aug 2023: Talk at Department of Mathematical Sciences, University of Alabama in Huntsville, USA
Sep 2021: [Mathematics Seminar](#), CUA, Washington, D.C.
Jul 2021: [UNC Greensboro PDE Conference](#), NC, USA
May 2020: [Computational and Applied Math Seminar](#), ORNL, USA
Aug 2019: Conference on Continuous Optim., TU Berlin, Germany
Jul 2019: Congress on Industrial and Applied Mathematics, Spain
Nov 2018: [Mathematics of Computation](#), ICERM, Brown University, USA
Jun 2017: Conference on Recent advances in PDEs, IIT Bombay, India
Dec 2016: Conference on Theoretical and Computational PDEs, PU, India
Nov 2016: Conference on Mathematical Analysis, IIT Roorkee, India
Jun 2016: Conference on Mathematics of FEM, Brunel University, UK
Dec 2015: Conference on Current Trends in PDEs, SAU, India
Nov, 2015: Conference on Mathematics, Univ. of Kerala, India

References

- [1] Logan Grosenick, Professor, Neuroscience, Weill Cornell Medicine, USA
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- [2] Conor Liston, Professor, Psychiatry, Weill Cornell Medicine, USA
✉ col2004@med.cornell.edu
- [3] Jean-Pierre Raymond, Professor, Mathematics, Institut de Mathématiques de Toulouse, France
✉ raymond@math.univ-toulouse.fr
- [4] Mythily Ramaswamy, Professor, Mathematics, TIFR CAM, India
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