

Department of Mathematics,
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Akansha Agrawal

Curriculum Vitae

Research Interests

Machine Learning
Deep Learning
Graph Neural Networks
Numerical Linear Algebra

Education

2015-2022 **Doctor of Philosophy**, *Applied Mathematics*, Indian Institute of Technology Bombay, *CPI – 8.84*.
(on scale of 10)

Supervisor Prof. S. Baskar

Thesis Title Padé-based approximations to univariate and bivariate non-smooth functions

2012–2013 **Masters of Science**, *Mathematics and Computing*, Indian Institute of Technology Guwahati, *CPI – 8.16*.
(on scale of 10)

Employment

- Aug 2022 - present Assistant professor in the Department of mathematics at Manipal Institute of Technology.
- Mar 2022 - Aug 2022 Research Assistant at Indian Institute of Technology Bombay with Prof. S. Baskar
- Jul 2018 - Nov 2018 Teaching Assistant at Indian Institute of Technology Bombay for Linear Algebra.
- Jan 2018 - May 2018 Teaching Assistant at Indian Institute of Technology Goa for Numerical Analysis.
- Jul 2016 - Nov 2017 Teaching Assistant at Indian Institute of Technology Bombay for Differential equations, Numerical Analysis and Complex Analysis.

Internships and Projects

- 2015 **Summer Project**, *Funded by the Department of Science and Technology (DST)*, IIT Bombay, February 2015 to April 2015.
Title *Preconditioners for Helmholtz equation*
Mentor Prof. S. Baskar
- 2014–2015 **Summer Intern**, *National Program on Differential Equations Theory, Computation and Applications (NPDE-TCA)*, IIT Bombay, May 2014 to January 2015.
Title *Preconditioners for Helmholtz equation*
Mentor Prof. S. Baskar
- 2013 **Master Project**, *A study on Banach Algebra*, IIT Guwahati.
Mentor Prof. Anjan K. Chakrabarty

Honors, Awards and Fellowships

- 2021-2022 Industrial Research and Consultancy Centre (IRCC) Research Fellowship.
2015-2020 Indian Institute of Technology Doctoral Fellowship.
2015 All India Rank in Graduate Aptitude Test in Engineering (GATE-MA) is 246.
2012 Indian Women's Association, Bonn (IWAB) Scholarship at Indian Institute of Technology Guwahati.
2011 Merit-Cum-Means Scholarship at Indian Institute of Technology Guwahati.
2011 All India Rank in Joint Admission Test for M.Sc. (JAM) is 175.

Talks

- A study on nonlinear approximations and their applications, in 'National Conference on Mathematical Modelling-Modern Approaches (MMMA-2017)' held during October 13-14, 2017 at DIT university Dehradun, India.
- International conference on "Recent advances in PDE-Theory Computations and Applications" held during June 8-10, 2017 at IIT Bombay.
- Shallow water waves and p -systems, Department of Mathematics, IIT Bombay, 2015.
- Banach Fixed Point Theorem and its Applications, Department of Mathematics, IIT Guwahati, 2012.

Workshops/Talks Attended

- Mini-Lecture series (Mathematical analysis of Deep Neural Networks) June 2022 at IIT Bombay
- Talk on Finite volume element method for sub-diffusion problems by Prof Samir Karaa from Sultan Qaboos University, Muscat, Oman, 2017 at IIT Bombay.
- Advance School for CIMPA School on "Current Research in Finite Element Methods" held during July 4-17, 2015 at IIT Bombay.
- Pre School for CIMPA School on "Current Research in Finite Element Methods" held during June 24 to July 4, 2015 at IIT Bombay.
- Orthogonal Spline Collocation Methods for PDEs, held during March 21-24, 2014 at South Asian University, New Delhi.
- Seminar on numerical linear algebra in the Department of Mathematics, March, 2013 at IIT

Guwahati.

- Talk on Linux operating system by CSEA, November, 2012 at IIT Guwahati.

Research Articles

- S. Akansha and S. Baskar. Adaptive Padé-Chebyshev type approximation to piecewise smooth functions, 2019. **Communicated** <https://arxiv.org/abs/2110.07173>
- S. Akansha. Piecewise Padé-Chebyshev reconstruction of bivariate piecewise smooth functions, 2021. **Preprint** <https://arxiv.org/abs/2109.11436>
- S. Akansha and S. Baskar. Reconstruction of Non-smooth functions using Finite Data, 2021. **Preprint**
- S. Akansha. Decay estimate of bivariate Chebyshev coefficients for functions with limited smoothness, 2022. **Communicated** <https://arxiv.org/abs/2205.00918>

Students

Under Graduate **Anirudh Kanaparth** *B.Tech 4th year Computer Science and Engineering. MIT MAHE*

Post Graduate **Simran** *M.Sc. 2nd year Applied Mathematics and computing. MIT MAHE*

References

- Prof. S. Baskar, IIT, Bombay (Email: baskar@math.iitb.ac.in)
- Prof. Neela Natraj, IIT, Bombay (Email: neela@math.iitb.ac.in)
- Prof. Anjan K. Chakrabarty, IIT Guwahati (Email: anjankc@iitg.ernet.in)

For Motivated Students

Research Assistance If you are someone who keen to explore the field of machine learning or deep learning and has expertise in Python, feel free to contact me.

Advice on conducting research I'm always happy to provide discussion on how to conduct research, especially for early-stage researchers. This has always lead to very stimulating conversations. However, I'm biased towards my area of research, that is, Graph Neural Network (GNN).