

Dr. Sonika Thakral

Associate Professor

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Biography

Dr. Sonika is an Associate Professor at the Department of Computer Science, Shaheed Sukhdev College of Business Studies, University of Delhi. She completed her post-doctoral research at IIT Delhi in 2021. She started her career as a teacher with University of Delhi in 2005 and has been associated with SSCBS since December, 2014. Her research interests include Theoretical Computer Science, Contemplative Neuroscience and Cognition. She is also interested in Yogic Sciences and its application to mental health.

Research

Post-doctoral research: Postdoc fellow from July 2019 to May 2021 at the National resource Centre for Value education in Engineering (NRCVEE), **Indian Institute of Technology Delhi** under the supervision of **Prof. Rahul Garg** (Amar Nath and Shashi Khosla School of Information Technology, Deptt. of CSE, NRCVEE **IIT Delhi**). During my post doctorate, I learnt the Functional Magnetic Resonance Imaging (fMRI) modality of neuroimaging. We started a neuroimaging-based study to understand the impact of certain yogic practices on the brain and simultaneously started developing new analysis techniques for fMRI data (currently running). We also explored the correlation between one's proficiency in balancing yogic postures and cognitive performance. Another project was about studying the efficacy of Yoga and Ayurveda in treating COVID-19 patients. We also conducted a lifestyle survey to understand if there is an evident correlation between lifestyle and some commonly prevalent diseases.

Ph.D.: Worked on the **Data Placement Problem** described next. Given a network graph whose nodes are servers, and a set of clients who need to access a database, place the database at the nodes of the graph so as to serve the clients while minimizing the cost of the solution. The cost of the solution may comprise one or both of the following components: cost of placing the data at the servers and the sum of distances between the clients and the servers they access. Two variants of the problem were studied under capacity constraints: The Replica Placement Problem and The Typed Data Placement Problem.

Publications

1. Fialoke, S., Tripathi, V., Thakral, S., Dhawan, A., Mahajan, V., Garg, R. (December 2023). Altered States of Consciousness during Yoga Nidra: An fMRI Study of Thalamic Connectivity. Mind, Brain and Consciousness (<https://iksmha.iitmandi.ac.in/mbcc/index.php#proceedings>).

2. Thakral, S., Rao, A. R., Mishra, S., Mishra, A., Bentur, S, Garg, R. (December 2023) A Survey-based Study During COVID Shows That Lifestyle Factors Correlate with Mental Health. *Mind, Brain and Consciousness* (<https://iksmha.iitmandi.ac.in/mbcc/index.php#proceedings>).
3. Thakral, S., Rao, A. R., Mishra, S., Mishra, A., Bentur, S, Garg, R. (August 2023). A Survey-based Study Shows That Lifestyle Factors and Mental Health Correlate with Appearance and Duration of COVID-like Symptoms. National Youth Conference on Indian Knowledge Systems (<https://drive.google.com/drive/folders/1xRjauSvB0f1CO4K-xrZ17R-VNTs54gir>) pg 51.
4. Thakral, S., Garg, R., & Bijlani, R. (2023). Age-related variation in lifestyle and its relationship to chronic disease as shown by a survey using a self-evaluation questionnaire. *Yoga Mimamsa*, 55(1), 12-24.
5. Bentur, S. A., Mishra, A., Kumar, Y., Thakral, S., Sanjiv, S., & Garg, R. (2022). Integrative Therapy based on Yoga, Ayurveda and Modern Western Medicine for treatment of high-risk cases of COVID-19: A telemedicine-based case series. *Indian Journal of Traditional Knowledge (IJTK)*, 21(3), 475-488, 0975-1068.
6. Singh, V., Thakral, S., Singh, K., & Garg, R. (2022). Examining cognitive sex differences in elite math intensive education: Preliminary evidence from a gender inequitable country. *Trends in Neuroscience and Education*, 26, 2211-9493.
7. Mishra, A., Bentur, S. A., Thakral, S., Garg, R., & Duggal, B. (2021). The use of integrative therapy based on Yoga and Ayurveda in the treatment of a high-risk case of COVID-19/SARS-CoV-2 with multiple comorbidities: a case report. *Journal of medical case reports*, 15(1), 1-12, 17521947.
8. Arora, S., Gupta, N., Khuller, S., Sabharwal, Y., & Singhal, S. (2014). Facility location with red–blue demands. *Operations Research Letters*, 42(6-7), 462-465, 0167-6377.
9. Aggarwal, A., Chakaravarthy, V. T., Gupta, N., Sabharwal, Y., Sharma, S., & Thakral, S. (2017, July). Replica Placement on Bounded Treewidth Graphs. In *Algorithms and Data Structures: 15th International Symposium, WADS 2017, St. John's, NL, Canada, July 31–August 2, 2017, Proceedings* (Vol. 10389, p. 13-24). Springer.
10. Arora, S., Chakaravarthy, V. T., Gupta, K., Gupta, N., & Sabharwal, Y. (2014, December). Replica Placement on Directed Acyclic Graphs. In *34th International Conference on Foundation of Software Technology and Theoretical Computer Science* (p. 213).
11. Arora, S., Agarwal, A., Chakaravarthy, V. T., & Sabharwal, Y. (2014, December). Algorithms for power-aware resource activation. In *2014 21st International Conference on High Performance Computing (HiPC)* (pp. 1-10). IEEE.
12. Arora, S., Chakaravarthy, V. T., Gupta, N., Mukherjee, K., & Sabharwal, Y. (2013, December). Replica Placement via Capacitated Vertex Cover. In *33rd International Conference on Foundations of Software Technology and Theoretical Computer Science* (p. 263).

13. Poster presentation of the paper titled ‘Mind and Body in Balance: Assessing Yoga to Demystify its effects on Cognitive Performance’ at the *Sixth Annual Conference of Association for Cognitive Science 2019*. Co-authors: Prof. Varsha Singh (Deptt. of Humanities and Social Sciences, IITD), Kunal Singh (JRF, Deptt. of Computer Science and Engineering, IITD), Prof. Sanjeev Jain (Deptt. of Mechanical Engineering, IITD), Prof. Rahul Garg (Deptt. of CSE, IITD).

Education

- Ph.D. (Theoretical Computer Science), University of Delhi, Title of the thesis: Approximation Algorithms for Data Placement Problems
- NET (UGC), Computer Science and Applications
- M.C.A., Gurukul Kangri University
- B.Sc. (H) Mathematics, University of Delhi

Areas of Interest

Theoretical Computer Science