Publications:

Journals

- Recurrence Relations Based on Minimization and Maximization (with E.M. Reingold), *J. of Math. Anal. and Applications*, 109, No.2 (August 1985), 591-604.

- Minimizing Channel Density in Standard Cell Layout, (with J. Blair, E.L. Lloyd, K.J. Supowit), *Algorithmica*, Vol. 2, No. 3, (1987), pp. 267-282.

- Optimum Lopsided Binary Trees (with E.M. Reingold), *Journal of A.C.M.*, vol. 36, No. 3, July 1989, pp.573-590.

- Lower Bounds on Maximal Layer and Convex Hull Problems, (with P. Ramanan), *Algorithmica* (1989) 4: 447-459.

- Stochastic Rearrangement Rules for Self-Organizing Data Structures, (with E.M. Reingold), *Algorithmica* (1991) 6:278-291.

- Algorithms for Enumerating All Spanning Trees of Undirected and Weighted Graphs, (with H. Ramesh), *SIAM Journal of Computing*, vol 24, No. 3. 1995.

- Speeding up Karmarkar's Algorithm for Multi-Commodity Flows, (with P. Vaidya), *Mathematical Programming*,Volume 73, Issue 1, April 1996, pp 111-127.

- New techniques for exact and approximate dynamic closest-point problems, (with M. Smid), *SIAM Journal of Computing*, August 1996.

- On the Complexity of approximating travelling salesman tours and minimum spanning trees, (with G. Das and M. Smid), *Algorithmica*, 1997.

- An Efficient Algorithm for Euclidean Shortest Paths amongst Polygonal Obstacles, (with S.N. Maheshwari and J.S.B. Mitchell). *Discrete & Computational Geometry*, 1997.

- Algorithms for Enumerating All Spanning Trees of Directed Graphs, (with H. Ramesh), to appear in *Algorithmica.*

- Efficiently constructing the visibility graph of a Simple Polygon with Obstacles, (with S.N.Maheshwari), (under revision) accepted for publication in *SIAM Journal of Computing.*

Conference Publications

- Efficient Algorithms for Quadratic programming and Multi-Commodity Flows, (with P. Vaidya) Procededings of the 18th Annual *ACM Symposium on Theory of Computing*, 1986, pp.147-159.

- Rectilinear shortest paths amongst Polygonal Obstacles, (with K. Clarkson and P. Vaidya), 3rd Annual *A.C.M. Symposium on Computational Geometry*, 1987.

- Efficient Algorithms for Euclidean Shortest Path and Visibility Problems with Polygonal Obstacles, (with S.N. Maheswari), 4th Annual *A.C.M. Symposium on Computational Geometry*, 1988,pp.172-182.

- On Enumerating all spanning trees of directed and undirected graphs, (with H. Ramesh), Proc. *Workshop on Algorithms and Data Structures*, Carleton University, Canada, Springer Verlag, August 1991.

- Algorithms for Relative Neighborhood Graphs and Vornoi Diagrams in Simple Polygons, (With V. Sarin), 4th *Canadian Conference on Computational Geometry*, 1992.

- New techniques for exact and approximate dynamic closest-point problems, (with M. Smid), 10th *ACM Symposium on Computational Geometry*, 1994.

- Dynamically Maintaining Maxima in 2-dimensions, 10th *ACM Symposium on Computational Geometry*, 1994.

- On Minmum 3-cuts and Approximating Graph Partitioning using Cut Trees, Proc. of 5th *International IPCO Conference* , LNCS Springer-Verlag, 1996.

- On the Complexity of approximating travelling salesman tours and minimum spanning trees, 1996 (with G. Das and M. Smid), Proc. of *FST & TCS*, India, LNCS Springer-Verlag, 1996.

- Dynamically maintaining shortest path trees in simple polygons, (with Tripurari Singh), Proc. of *FST & TCS*, India, LNCS, Springer-Verlag, 1996.
- Dynamic Binary Space Partitioning for hidden surface removal, (with A. Kumar, V. Kwatra, B. Singh), Proc. of *ICGVIP* 1998 (part B), New Delhi.
- Using Separating Planes between Objects for Dynamic Binary Space Partitioning, (with A. Kumar, V. Kwatra, B. singh), to appear in Proc of *International Conference on Visual Computing*, Goa, India, Feb. 1999.
- Efficiently computing Geodesic Shortest Paths, to apppear in *ACM Symposium on Theory of Computing*, 1999.

Other manuscripts

- An extension of Karmarkar's interior point method to convex qudratic programming,(with P. Vaidya)Technical Report, University of Illinois at Urbana-Champaign, 1988.
- Rectlinear shortest Path amongst Polygonal Obstacles, (with K. Clarkson and P. Vaidya).
- Efficient Algorithms for Flows and Shortest Paths in Polygonal Domains, Technical Report, 1993 (with S.N. Maheshwari).
- An Efficient Wavefront Method, 1993 (revised 1995),submitted (under revision).
- Dynamically Maintaining Maxima in 2-dimensions, 1995, submitted for journal publication.
- On the Dynamic Maintainence of 2-D Convex Hulls, Technical Report Max-Planck Institut fur Informatik, 1995, submitted.
- Covering Relations and Language Classes with Applications, extended abstract, to be submitted.
- The Approximate Geographic Neighborhood Tree with Applications, extended abstract, submitted.

- An Exchange Method for Minimum Spanning Trees and Matroids, manuscript.

Research Projects

(1) *Dynamic Schemes in Computational Geometry*, Young Scientist Project Award, from Dept. of Science and Technology, India, 1994-1996. (Value: Rs 1,28,000)

The project dealt with the design of *data structures* for dynamically maintaining geometric configurations.

From an applications viewpoint implementation of a scheme for dynamic maintenance of a scene of polyhedral objects viewed from a fixed viewpoint was also carried out. The scene is allowed to change due to insertions of polyhedron. Extensions are under way to allow for deletions.

(2) Member of Executive Committee of *TRIPP*. Project on bus route optimization in *Transport Research* with *TRIPP*. TRIPP is a recently established program at IIT Delhi.

(3) Dynamic Hidden Surface Removal Problems, (Principal Investigator), project to be funded by Dept. of Science and Tech. (Value: Rs. 10,00,000)

(4) Methodology for Embedded System Design, project funded by NRB, India.