

**Professor**  
**Department of Earth Sciences**

**Research Specialization: (Major Scientific Fields of interest)**

Numerical Simulation of large systems,  
Modelling and inversion of geophysical data

**Educational Qualifications :**

<b>Degree</b>	<b>Institution Conferring</b>	<b>Field(s)</b>	<b>Year</b>
B.Sc.(Hons.) Physics	Delhi University	Phys., Maths., Stats.	1970
M.Sc.(Physics)	Delhi University	Physics	1972
Ph.D.	Roorkee University	Geophysics	1988

**Scholarship: National Science Talent Scholarship (1967-1976)**

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**Research/Teaching Experience :**

<b>Duration</b>	<b>Institution</b>	<b>Designation</b>	<b>Nature of work done</b>
1972 - 1976	Delhi University	National Science Talent Research Scholar	Modelling of Astrophysical Systems
1976 - 1979	Roorkee University	Senior Research Fellow	DC Resistivity Modelling for Hydrocarbon bearing structures
1979 - 1981	Roorkee University	Research Associate	Inversion and Modelling of geoelectric data.
1981 - 1984	Roorkee University	Lecturer	Teaching and Research in theoretical geophysics
1984 - 1986	CSIRO, Australia	Scientist	3-D Electromagnetic modelling
1986 - 1994	Roorkee University	Lecturer	Teaching and research in modelling and inversion of geoelectromagnetic

1994 - 1996	Roorkee University	Reader	data Teaching and research in modelling and inversion of geoelectromagnetic data
1996 - 1999	Western Atlas Logging Services, USA	Research Scientist	Development of software for induction logging data inversion
1999 - present	Roorkee University	Associate Professor	Teaching and research in modelling and inversion of geoelectromagnetic data

### **Research Specialization:**

Numerical Simulation of large systems, Modelling and inversion of geophysical data

### **Ph. D. Thesis :**

3-D EM Modelling using Compact Finite Element ( Supervisors: Profs. V.K.Gaur,  
A.P.Raiche, P.S.Moharir)

### **Research Publications :**

- 1.Gaur, V.K., Nayak, G.C., Gupta, P.K., 1979, A versatile approach to geoelectric depth sounding over complex buried structures using FEM, Presented at the 41<sup>st</sup> AEAG Meeting held at Hamburg. Abstract published in *Geophysical Prospecting*, 27, 694.
- 2.Gaur, V.K., Gupta, P.K., 1979, Inversion of apparent resistivity data over buried geological structures amenable to conformal transformation, presented at 46<sup>th</sup> Ann. Intl. SEG meeting held at New Orleans. Abstract published in *Geophysics*, 45, 574.
- 3.Gupta, P.K., 1980, Graph theoretic field modelling: A new dimension to geophysical modelling, Presented at the 6<sup>th</sup> Annual Convention of AEG held at Bangalore.
- 4.Gaur, V.K., Nayak, G.C., Gupta, P.K., 1980, Finite element modelling for evaluation of apparent resistivity over complex structures. *Proc. Ind. Acad. Sci.(EPS)*, 89(1), 43-49.
- 5.Gaur, V.K., Sri Niwas, Gupta, P.K., Viswanathan, R., 1982, Determination of depths to basement rocks using Backus-Gilbert method, Presented at IUGG Meeting held in Brazil
- 6.Raiche, A.P., Gupta, P.K., 1986, Three dimensional transient EM modeling using a hybrid method, Presented at 8<sup>th</sup> IAGA EMI Workshop held at Neuchatel, Switzerland
- 7.Raiche, A.P., Gupta, P.K., 1987, Three dimensional transient EM modelling using a hybrid method, Presented at 5<sup>th</sup> ASEG Biennial Meeting held at Perth, Australia

8. Gupta, P.K., Bennett, L.A., Raiche, A.P., 1987, Hybrid calculations of the three dimensional electromagnetic response of buried conductors. *Geophysics*, 52(3), 301-306.
9. Raiche, A.P., Gupta, P.K., 1987, Hybrid methods for solving the 3D vector diffusion and 3D vector Helmholtz equations over infinite domains, Presented at CTAC Conf. held in Sydney.
10. Gupta, P.K., 1988, Use of Heaviside operator theory for obtaining expressions of Green's Dyadic in EM theory, Presented at 12<sup>th</sup> AEG Convention held at Waltair.
11. Gupta, P.K., Gaur, V.K., 1988, Use of Hartley transform in geophysical modelling, Presented at 12<sup>th</sup> AEG Convention held at Waltair.
12. Gupta, P.K., Lewi, E., Khattri, K.N., 1988, When 2D approximation of 3D gravity anomaly is justified?, Presented at 12<sup>th</sup> AEG Convention held at Waltair.<sup>th</sup>
13. Gupta, P.K., 1988, SAMAYA – A 3D EM modelling algorithm, Presented at the International workshop on Deep Electromagnetic held at NGRI Hyderabad.
14. Gupta, P.K., Raiche, A.P., Sugeng, F., 1989, Three dimensional time domain electromagnetic modelling using a compact finite element frequency-stepping method. *Geophysical Journal Intl.*, 96, 457-468.
15. Mukherjee, P.K., Gupta, P.K., 1989, Least Squares modelling of crystal fractionation in Pavagadh Lava Flows of Gujarat, *Jr. Geol. Soc. Ind.*, 34, 263 – 276
16. V.K. Gaur, Sri Niwas, Gupta, P.K., Viswanathan, R., 1991, estimation of depth to the magnetic rocks using Backus-Gilbert Method, *Jr. Assoc. Expl. Geophys.*, 12(1), 1-10.
17. Sri Niwas, Gupta, P.K., 1991, Effect on stability of the inverse solution with 1 Ohm m change in Embedded 'thick' conducting layer's threshold resistivity, *Acta Geod. Geoph. Mont. Hung.*, 26(1-4), 423-434.
18. Goyal, V.C., Sri Niwas, Gupta, P.K., 1991, Theoretical evaluation of modified Wenner array for Shallow resistivity exploration, *Ground Water*, 29(4), 582-586.
19. Lewi, E., Gupta, P.K., Khattri, K.N., 1994, 2-d inversion of 3-d gravity anomalies, *Proc. Nat. Acad. Sci Ind.*, 64(A), IV, 513-527.
20. Gahalaut, V.K., Gupta, P.K., Chander R., Gaur, V.K., 1994, Minimum norm inversion of observed ground elevation changes for slips on the causative fault during the 1905 Kangra earthquake, *Proc. Ind. Acad. Sci (EPS)*, 103(3), 401-411.
21. Singh, Y.P., Gupta, P.K., Sri Niwas, 1996, 2-D inversion of EM data using integral equation method, *Jr. Assoc. Expl. Geophys.*, 17(4), 155-164.

22. Gupta, P.K., Sri Niwas, Gaur, V.K., 1996, Straightforward inversion scheme (SIS) for one-Dimensional magnetotelluric data, *Proc. Ind. Acad. Sci.(EPS)*, 105(4), 413-429.
23. Goyal, V.C., Gupta, P.K., Seth, S.M., Singh, V.N., 1996, Estimation of temporal changes in soil moisture using resistivity method, *Hydrological Processes*, 10, 1147-1154.
24. Gupta, P.K., Sri Niwas, Gaur, V.K., 1997, Straightforward inversion of vertical electrical Sounding data, *Geophysics*, 62(3), 775-785.
25. Rastogi, A., Gupta, P.K., Sri Niwas, 1997, Multigrid inversion of 2-D EM data using bi-conjugate gradient method, *Jr. of geophys.*, 18(1), 43-49.
26. Rastogi, A., Gupta, P.K., Sri Niwas, 1998, Inversion of GDS data of Northwest Himalaya using EM2INV, *Proc. Ind. Acad. Sci.(EPS)*, 107(2), 149-154.
27. Gupta, P.K., Sri Niwas, Rastogi, A., 1999, EM2INV – a finite difference based algorithm for two-dimensional inversion of geoelectromagnetic data, *Proc. Ind. Acad. Sci.(EPS)*, 108(4), 233-253.
28. Mollison, R.A., Schon, J.S., Fanini, O.N., Kriegshauser, B., Meyer, W.H., Gupta, P.K., 1999, A model for hydrocarbon saturation determination from an orthogonal tensor relationship in thinly laminated anisotropic reservoirs, Proceedings of SPWLA 40<sup>th</sup> Annual Logging Symposium, May 30-June 3, 1-14.
29. Kriegshauser, B., Fanini, O.N., Forgang, S., Mollison, R.A., Yu, L., Gupta, P.K., Koelman, J.M.V., van Popta, 2000, Increased oil-in-place in low resistivity reservoirs from multi-component induction log data, accepted for publication in the Proc. SPWLA 41<sup>st</sup> Annual Logging Symposium.
30. Kriegshauser, B., Fanini, O.N., Forgang, S., Yu, L., Gupta, P.K., Maher, T., Popta, J. van, 2000, Increased Net Pay in Finely Laminated Low Resistivity Reservoirs Using Multi-component Induction Logging Tool Data, accepted for publication in the Proc. AAPG Annual Meeting.
31. Kriegshauser, B., Fanini, O.N., Yu, L., Gupta, P.K., 2000, Advanced inversion techniques for Multicomponent induction log data, accepted for publication in Proc. 70<sup>th</sup> Annual Meeting of SEG, Calgary, Canada, August 2000.
32. Kriegshauser, B., Fanini, O.N., Yu, L., Gupta, P.K., van der Horst, 2000, well-site interpretation of multicomponent induction log data in anisotropic media, accepted for publication in Proc. of SPE Annual Technical Conference and Exhibition
33. Sri Niwas, Gupta, P.K., Gaur, V.K., 2000, MT response functions and the Straightforward Inversion Scheme, submitted **for publication in *Geophysics***.

**Book Published:**

Indira, N.K., Gupta, P.K., 1998, Inverse Methods: General Principles and Applications to Earth System Sciences, Narosa Publishing House

**Research Patents :**

Gupta, P.K., Kriegshauser, B.F., Jericevic, Z., Fanini, O.N., 1998, Method for inversion processing of transverse electromagnetic induction well logging measurements, U.S. Patent no. 5,854,991.

Gupta, P.K., Kriegshauser, B.F., Fanini, O.N., 1999, Conductivity anisotropy estimation method for inversion processing of measurements made by a transverse electromagnetic induction well logging instrument, U.S. Patent no. 5,999,883.

Kriegshauser, B.F., Gupta, P.K., Zelko, J, Fanini, O.N., 1999, Method for determining the axial position of formation boundaries using measurements made by a transverse electromagnetic induction logging instrument, U.S. Patent no. 5,999,884.

Chakravarthy, S., Chundurur, R., Gupta, P.K., Kriegshauser, B.F., Fanini, O.N., 1997, Conductivity anisotropy estimation for inversion processing of measurements made by a transverse electromagnetic induction logging instrument, pending with the U.S. Patent office.

**Research Supervised:**

6 Ph. D. and 20 M. Tech. Theses

**Titles of Ph.D. Theses Supervised :**

1. Goyal, V.C., 1993, Numerical Modelling of resistivity for estimating temporal changes in soil moistures, Dept. of Earth Sciences, University of Roorkee. (Co-supervisors: V.N.Singh, S.M.Seth.)
2. Gahalaut, V.K., 1995, On rupture zones and geodynamic processes of great earthquakes along the Himalayan convergent plate margin, Dept. of Earth Sciences, University of Roorkee. (Co-supervisor: R. Chander)
3. Bhar, A.K., 1996, Mathematical modelling of springflow, Dept. of Earth Sciences, University of Roorkee. (Co-supervisors: B.B.S.Singhal, G.C.Mishra)
4. Kapur, N., 1997, Stress and displacement simulations for earthquake processes in the Himalaya. Dept. of Earth Sciences, University of Roorkee. (Co-supervisors: R. Chander)

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5.Rastogi, A., 1997, Electromagnetic modelling and inversion using finite difference method, Dept. of Earth Sciences, University of Roorkee. (Co-supervisors: Sri Niwas)

6.Sarkar, S., 1997, Landslide hazards zonation of Garhwal Himalaya, Dept. of Earth Sciences, University of Roorkee. (Co-supervisors: R. Anabalagan, G.S.Malhotra)