

## Gorti B. Sarma

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### Education

Ph.D.	Mechanical Engineering , Cornell University, Ithaca, NY	1995
M.S.	Mechanical Engineering , Cornell University, Ithaca, NY	1993
B.Tech.	Mechanical Engineering , Indian Institute of Technology, Madras	1990

### Honors and Awards

Phi Kappa Phi Honor Society  
McMullen Fellowship, Cornell University, 1992, 1995  
National Talent Search Scholarship, India, 1984 - 1990

### Research Interests

A variety of disciplines related to the mechanics and computational modeling of the thermomechanical processing of metals, including continuum mechanics, inelasticity, polycrystal plasticity, internal state variable and micromechanical constitutive models, formulations for finite deformations, finite element analysis, high performance and parallel computing

### Research Experience

*Sep 1995 – present (Oak Ridge National Laboratory, Oak Ridge, TN)*

- Developed and implemented finite element models to simulate deformation of metal polycrystals at the mesoscale on massively parallel supercomputers
- Conducted finite element simulations at the mesoscopic level to study the inhomogeneous deformations of grains through explicit discretization of metal polycrystals
- Developed an implicit integration scheme to predict the mechanical response and change in orientation of an elasto-viscoplastic material subjected to large deformations
- Performed thermal and mechanical analyses of composite tubes used in recovery boilers by pulp and paper industry to determine stresses in tubes under various operating conditions

*Aug 1990 – Aug 1995 (Cornell University, Ithaca, NY)*

- Developed a new model incorporating neighbor interaction effects to distribute the deformation applied to a polycrystalline aggregate among the individual crystals in a non-uniform fashion, and obtained improved results with new model in predicting deformation textures
- Performed finite element simulations of the deformation of a model fcc polycrystal on a massively parallel supercomputer (Connection Machine CM-5), and analyzed data to determine the role of interactions among crystals on the inhomogeneous deformation of the polycrystal
- Performed finite element simulations of cold rolling of silicon steel to study through thickness variations in texture development

*Dec 1989 – May 1990 (Indian Institute of Technology, Madras, India)*

- Incorporated two formulations for solving elastic contact problems into FE codes, implemented schemes to optimize performance and minimize storage requirements, and investigated the relative merits of each formulation for a variety of problems

## Professional Societies

The Minerals, Metals, and Materials Society (TMS)

## Publications

Refereed journals: 15, Conference proceedings: 15, Technical reports: 6

## Selected Publications

- G.B. Sarma, B. Radhakrishnan and P.R. Dawson, "Mesoscale modeling of microstructure and texture evolution during deformation processing of metals," *Adv. Eng. Mater.*, to appear (2002).
- J.R. Keiser, G.B. Sarma, X.L. Wang, C.R. Hubbard, R.W. Swindeman, D.L. Singbeil and P.M. Singh, "Why Do Kraft Recovery Boiler Composite Floor Tubes Crack?" *TAPPI Journal*, 84, 48-48 (2001).
- G.B. Sarma, J.R. Keiser, X.-L. Wang and R.W. Swindeman, "Modeling studies to predict stresses in composite floor tubes of black liquor recovery boilers," *J. Eng. Mater. Technol.*, 123, 349-354 (2001).
- B. Radhakrishnan, G. Sarma, H. Weiland and P. Baggethun, "Simulations of deformation and recrystallization of single crystals of aluminum containing hard particles," *Modelling Simul. Mater. Sci. Eng.*, 8, 737-750 (2000).
- B. Radhakrishnan, G. Sarma and T. Zacharia, "Mesoscale modeling of cube texture evolution during hot deformation," in *Proc. of ICOTOM 12, the Twelfth Inter. Conf. on Textures of Materials*, ed. by J. A. Szpunar, NRC Research Press, Ottawa, pp. 352-357 (1999).
- G. Sarma, B. Radhakrishnan, and T. Zacharia, "Modelling the deformation of face centered cubic crystals to study the effect of slip on {110} planes," *Modelling Simul. Mater. Sci. Eng.*, 7, 1025-1043 (1999).
- G. Sarma and T. Zacharia, "Integration algorithm for modeling the elasto-viscoplastic response of polycrystalline materials," *J. Mech. Phys. Solids*, 47, 1219-1238 (1999).
- G.B. Sarma, B. Radhakrishnan and T. Zacharia, "Finite element simulations of cold deformation at the mesoscale," *Comput. Mater. Sci.*, 12, 105-123 (1998).
- B. Radhakrishnan, G. Sarma and T. Zacharia, "Monte Carlo simulation of deformation substructure evolution during recrystallization," *Scripta mater.*, 39, 1639-1645 (1998).
- B. Radhakrishnan, G.B. Sama and T. Zacharia, "Modeling the kinetics and microstructural evolution during static recrystallization-Monte Carlo simulation of recrystallization," *Acta mater.*, 46, 4415-4433 (1998).
- G. Sarma, B. Radhakrishnan and T. Zacharia, "Polycrystal simulations of texture evolution during deformation processing," in *Hot Deformation of Aluminum Alloys II*, ed. by T.R. Bieler, L.A. Lalli and S.R. MacEwen, TMS, Warrendale, pp. 279-290 (1998).
- G. Sarma, T. Zacharia and D. Miles, "Using High Performance Fortran for parallel programming," *Comput. Math. Appl.*, 35, 41-57 (1998).
- G.B. Sarma and P.R. Dawson, "Texture predictions using a polycrystal plasticity model incorporating neighbor interactions," *Int. J. Plast.*, 12, 1023-1054 (1996).
- G.B. Sarma and P.R. Dawson, "Effects of interactions among crystals on the inhomogeneous deformations of polycrystals," *Acta mater.*, 44, 1937-1953 (1996).
- G.B. Sarma and P.R. Dawson, "Simulating deformation-induced texture evolution during cold rolling," in *Simulation of Materials Processing: Theory, Methods and Applications (Proc. NUMIFORM'95)*, Eds S.F. Shen and P.R. Dawson, Balkema, Rotterdam, pp. 971-976 (1995).
- P. Dawson, A. Beaudoin, K. Mathur and G. Sarma, "Finite element modeling of polycrystalline solids," *European Journal of Finite Elements*, 3, 543\_571 (1994).