

PHASE FIELD PUBLICATIONS OF G. CAGINALP (AUGUST 30, 2010)

1. "An analysis of a phase field model of a free boundary" *Archive for Rational Mechanics and Analysis* 92, 205-245 (1986). Submitted in final form in 1983. Earlier version: CMU Research Report 82-5 (1982).
2. "Properties of some ordinary differential equations related to free boundary problems" (with S. Hastings) *Proceedings of the Royal Society of Edinburgh* 104A, 217-234 (1986).
3. "Surface tension and supercooling in solidification theory" *Lecture Notes in Physics* 216, 216-226 (Applications of Field Theory to Statistical Mechanics, ed. L. Garrido) Springer, Berlin (1984).
4. "Phase field models of solidification: Free boundary problems as systems of nonlinear parabolic differential equations" *Free Boundary Problems: Applications and Theory* 107-121 (eds. A. Bossavit *et. al.*) (1985).
5. "Solidification problems as systems of nonlinear differential equations" *Lectures in Applied Mathematics* 23, 347-369 (1986).
6. "The interior transition layer for ordinary differential equations arising from solidification theory" (with B. McLeod) *Quarterly of Applied Mathematics* 44, 155-168 (1986).
7. "Elliptic problems involving phase boundaries satisfying a curvature condition" (with P. C. Fife) *IMA Journal of Applied Mathematics* 38, 195-217 (1987).
8. "Elliptic problems with layers representing phase interfaces" (with P. C. Fife) *Nonlinear Parabolic Equations: Qualitative Properties of Solutions*, Pitman Research Notes in Mathematics 149, 50-54 (Eds. Boccardo, L. and Tesei, A.) (1987).
9. "The role of microscopic anisotropy in the macroscopic behavior of a phase boundary" *Annals of Physics* 172, 136-155 (1986).
10. "Phase-field methods for interfacial boundaries" (with P. C. Fife) *Physical Review B* 33, 7792-7794 (1986).
11. "Higher order phase field models and detailed anisotropy" (with P. C. Fife) *Physical Review B* 34, 4940-4943 (1986).
12. "Phase field models of free boundary problems: Exterior boundaries, higher order equations and anisotropy" (with P. C. Fife) *Structure and Dynamics of Partially Solidified Systems* NATO ASI Series E 125, 131-140 (Ed. D. E. Loper) (1987).

13. "A numerical analysis of an anisotropic phase field model" (with J.T. Lin) *IMA Journal of Mathematics* 39, 51-66 (1987).
14. "Mathematical models of phase boundaries" *Material Instabilities in Continuum Problems and Related Mathematical Problems* (Ed. J. Ball) 35-52, Oxford Science Publications (Symposium 1985-1986).
15. "Dynamics of layered interfaces arising from phase boundaries" (with P. C. Fife) *SIAM Journal of Applied Mathematics* 48, 506-518 (1988).
16. "A Mathematical Approach to Crystal Growth" *Superlattices and Microstructures* 3, 595-598 (1987).
17. "Phase field models: some conjectures on theorems for their sharp interface limits" in *Free Boundary Problems* (Ed. K. H. Hoffman) (1987).
18. "Phase field models and sharp interface limits: some differences in subtle situations" *Rocky Mountain Journal of Mathematics* 21, 603-616 (1991).
19. "A conserved phase field system; implications for kinetic undercooling" *Physical Review B* 38, 789-791 (1988).
20. "Stefan and Hele-Shaw type models as asymptotic limits of the phase field equations" *Physical Review A* 39, 5887-5896 (1989).
21. "The dynamics of a conserved phase field system: Stefan, Hele-Shaw and spinodal decomposition models as asymptotic limits" *IMA Journal of Applied Mathematics* 44, 77-94 (1989).
22. "Generalized phase field equations and the single equation . . ." University of Pittsburgh Research Report (1988).
23. "Efficient computation of a sharp interface by spreading via phase field methods" (with E. A. Socolovsky) *Applied Mathematics Letters* 2, 117-120 (1989).
24. "Computation of sharp phase boundaries by spreading: the planar and spherically symmetric cases" (with E. A. Socolovsky) *Journal of Computational Physics* 95, 85-100 (1991).
25. "A microscopic derivation of macroscopic phase boundary problems" *Journal of Statistical Physics* 59, 869-884 (1990).
26. "The existence of traveling waves for phase field equations and convergence to sharp interface models in the singular limit" (with Y. Nishiura) *Quarterly of Applied Mathematics* 49, 147-162 (1991).

27. "Phase field equations with fluid properties" (with J. Jones) *Free Boundary Problem involving Solids* (eds. J. Chadam and H. Rasmussen) 96-99 Pitman, New York (1993).
28. "A unified computational approach to phase boundaries by spreading: single needle, crystal growth and motion by mean curvature" (with E. A. Socolovsky) *Free Boundary Problems involving Solids* (eds. J. Chadam and H. Rasmussen) 100-109 Pitman, New York (1993).
29. "A derivation of a phase field model with fluid properties" (with J. Jones) *Applied Math Letters* 4, 97-100 (1991).
30. "A phase-fluid model: derivation and new interface relation" (with J. Jones) in *IMA Volumes on Mathematics and its Applications* 43, (eds. M. E. Gurtin and G. B. McFadden) 29-50 (1991).
31. "Phase field equations in the singular limit of sharp interface problems" (with X. Chen) in *IMA Volumes on Mathematics and its Applications* 43, (eds. M. E. Gurtin and G. B. McFadden) 1-28 (1991).
32. "Convergence of traveling waves for phase field equations to sharp interface models in the singular limit" (with Y. Nishiura) in *IMA Volumes on Mathematics and its Applications* 37 (eds. R. Aris *et. al.*) 151-158 (1991).
33. "Efficient computation of interfaces and instabilities by smoothing via phase field methods" (with E. A. Socolovsky), *Advances in Mathematics, Computation and Reactor Physics* (1991).
34. "Phase field computations of single-needle crystals, crystal growth and motion by mean curvature" (with E. A. Socolovsky) *SIAM Journal of Scientific Computing* 15, 106-126 (1994).
35. "The issues of anisotropy and traveling wave velocity selection in the phase field model" to appear in *Free Boundary Problems involving Solids* (eds. J. Chadam and H. Rasmussen) 92-95 Pitman, New York (1993).
36. "Penrose-Fife modification of solidification equations ...," *Applied Math Letters* 5, 93-96 (1992).
37. "Phase field and sharp interface alloy models" (with W. Xie) *Physical Review E*, 48, 1897-1909 (1993).
38. "Mathematical models of phase boundaries in alloys: phase field and sharp interface" (with W. Xie) *Motion by Mean Curvature* (eds. G. Buttazzo and A. Visintin) de Gruyter Publ. (1994).
39. "A derivation and analysis of phase field models of thermal alloys" (with J. Jones) *Annals of Physics* 237, 66-107 (1995).
40. "Convergence of phase field model to its sharp interface limits" (with X. Chen) *European Journal of Applied Mathematics* 9, 417-445 (1998).

41. "An analysis of phase-field alloys and transition regions" (with W. Xie) *Archive for Rational Mechanics and Analysis* 142, 293-329 (1998).
42. "Length scales in phase transition models: phase field, Cahn-Hilliard and blow-up problems" *Fields Inst Comm* 5, 67-83 (1996) in *Pattern Formation: Symmetry Methods and Applications*, American Math Society.
43. "Mathematical analysis of phase field alloys" (with W. Xie) in *Free Boundary Problems, theory and application*, Pitman Research Notes in Mathematics, Eds. M. Niezgodka and P. Strzelecki, 61-88, Addison Wesley Longman, Essex UK (1996).
44. "Computations of dendrites in 3-D and comparison with microgravity experiments" (with Y. B. Altundas) *J. Statistical Physics* 110, 1055-1066 (2002).
45. "Rapidly converging phase field models via second order asymptotic" (with C. Eck) *Discrete and Continuous Dynamical Systems, Series B*, 142-152 (2005).
46. "Parallel computation of single-needle dendrites in 3D and comparison with microgravity experiment," (with Y. B. Altundas). *Moving Boundaries VII*, eds. A. A. Mammoli and C. A. Brebbia, WIT Press, 347-349, (2003).
47. "Velocity selection in 3D dendrites: phase field computations and microgravity experiments," (with Y.B. Altundas) *Nonlinear Analysis: Theory Methods and Applications*, Series A.
48. "A Rapidly Converging Phase Field Model," (with X. Chen and C. Eck) *Discrete and Continuous Dynamical Systems* 4, Series A, 1017-1034, 2006.
49. "Numerical tests of a phase field model with second order accuracy" (with Xinfu Chen and C. Eck) *SIAM Applied Math* 68, 1518-1534 (2008).
50. "Anisotropic Phase Field Equations of Arbitrary Order," (with Emre Esenturk) to appear in *Discrete and Continuous Dynamical Systems, Series S*.
51. "Interface condition for a phase field model with anisotropic and non-local interactions," Preprint (with Xinfu Chen and E. Esenturk).
52. "An integral phase field model with non-local potential and anisotropy," Preprint (with Xinfu Chen and E. Esenturk).