

***CURRICULUM VITAE***  
**Vaughan R. Voller**

**Biographical Data**

Date of Birth: June 24, 1954

Citizenship: British, U.S. Permanent Resident

**Degrees Conferred**

1980 Ph.D., Applied Mathematics, University of Sunderland U.K.

1977 M.S., Continuum Mechanics, University of East Anglia, U.K.

1975 B.S., Applied Mathematics, University of East Anglia, U.K.

**Research Interests**

My principal research interest is the development of numerical and mathematical techniques to be used in computational models to describe and understand heat and mass transport phenomenon. A core theme has been the construction of methodologies for handling free and moving boundary value problems associated with phase-change systems. Key examples include, finite element based modeling of melting and solidification phenomena, crystal growth, hydraulic fracturing, polymer mold filling, transport in porous media, and the formation of sedimentary deltas. I also have a strong interest in exact mathematical treatments, e.g., analytical solutions of phase-change/moving-boundary problems related to crystal growth and sedimentary deltas and investigating the applications of fractional calculus to describe non-local diffusive transport systems. In contrast to this more rigorous mathematical work, I also have an emerging interest in developing reduced complexity rule-based models of mass transport systems with particular emphasis of creating channel resolving models of sedimentary deltas.

**Employment Experience**

9/97-present	<i>Professor and Associate Head</i> Department of Civil Engineering University of Minnesota - Twin Cities
9/88-9/97	<i>Associate Professor</i> Department of Civil Engineering University of Minnesota - Twin Cities
12/85-9/88	<i>Assistant Professor</i> Department of Civil Engineering University of Minnesota - Twin Cities
7/82-12/85	<i>Senior Lecturer</i> Department of Mathematics, Statistics and Computing University of Greenwich London, U.K.

10/80-7/82            *Post Doctoral Fellow*  
Mineral Resources Research Center (MRRC)  
Department of Civil Engineering  
University of Minnesota - Twin Cities

### **Honors and Awards**

2006 Aditya Birla Chair, Mechanical Engineering, Indian Institute of Science, Bangalore

2005 Listed in Who's Who in Computational Science and Engineering  
<http://www.wwcse.com/whosin.html>

1998 Best Paper Award. Modeling of Casting, Welding and Advances Solidification Processes.

1994 Outstanding Instructor Award, Institute of Technology, University of Minnesota

1985 Elected Fellow of the Institute of Mathematics and its Applications (U.K.)

### **Scholarships and Fellowships**

1977-1979 Science Research Council (U.K.) Graduate Fellowship

1980-1982 Office of Surface Mining Post-Doctoral Fellowship, U.S. Bureau of Mines

### **Professional Societies Membership**

Institute of Mathematics and its Applications (Fellow) (U.K.)  
The Metallurgical Society  
American Society of Engineering Education

### **Professional Registration**

Chartered Mathematician (U.K. Professional Status)

## JOURNAL PUBLICATIONS

1. V.R. Voller, On a fractional derivative form of the Green-Ampt infiltration model, *Advances in Water Resources*, **34**, 257-262, 2011.
2. G. Parker, others, V.R.Voller, A new framework for modeling the migration of meandering rivers, *Earth Surface Processes and Landforms*, **36**, 70-86, 2011.
3. Q. Qian, V.R. Voller, H.G. Stefan, Conditions when anisotropy is negligible for solute transfer in sediment beds of lakes or streams, *Advances in Water Resources*, **33**, 1542-1550, 2010.
4. V.R. Voller, An exact solution of a limit case Stefan problem governed by a fractional diffusion equation, *International Journal of Heat and Mass Transfer*, **53**, 5622-5625, 2010.
5. V.R. Voller, A model of sedimentary delta growth: a novel application of numerical heat transfer methods, *International Journal of Numerical Methods for Heat & Fluid Flow*, **20**, 570-586, 2010.
6. S. Koric, B.G. Thomas, V.R. Voller, Enhanced Latent Heat Method to Incorporate Superheat Effects into Fixed-Grid Multiphysics Simulations, *Numerical Heat Transfer Part B-Fundamentals*, **57**, 396-413, 2010
7. V.R. Voller, C. Paola, Can anomalous diffusion describe depositional fluvial profiles? *Journal of Geophysical Research-Earth Surface*, **115**, F00A13, 2010.
8. J. Lorenzo-Trueba, V.R.Voller, Analytical and numerical solution of a generalized Stefan problem exhibiting two moving boundaries with application to ocean delta formation, *Journal of Mathematical Analysis and Applications*, **366**, 538-549, 2010.
9. V.R. Voller, Analytical models of solidification phenomena, *Transactions of the Indian Institute of Metals*, **62**, 279-283, 2009.
10. A. Kao, G. Djambazov, K. Pericleous, V.R. Voller, Thermoelectric MHD in dendritic solidification *Magnetohydrodynamics* **45**, 305-315, 2009
11. I.L. Ferreira, V.R. Voller, B. Nestler, et al. Two-dimensional numerical model for the analysis of macrosegregation during solidification. *Computational Materials Science*, **46**, 358-366, 2009.
12. A. Kao, K. Periceous, M.K. Patel, V.R.Voller, Effects of magnetic fields on crystal growth, *International Journal of Cast Metals Research*, **22**, 147-150, 2009.
13. J. Lorenzo-Trueba J, V.R. Voller, T. Muto, A similarity solution for a dual moving boundary problem associated with a coastal-plain depositional system, *Journal of Fluid Mechanics*, **628**, 427-443, 2009

14. S.Patnaik, V.R. Voller, G. Parker, et al., Morphology of a melt front under a condition of spatial varying latent heat, *International Communications in Heat and Mass Transfer*, **36**, 535-538, 2009.
15. Q. Qian, J.J. Clark, V. Voller and H. Stefan, Depth-dependent dispersion coefficient for modeling of vertical solute exchange in a lake bed under surface waves, *Journal of Hydraulic Engineering*, **135**, 187-197, 2009.
16. Q. Qian, V. Voller and H. Stefan, Modeling of vertical solute dispersion in a sediment bed enhanced by wave induced interstitial flow, *Journal of American Water Resources Association*, **45**, 343-354, 2009
17. V.R. Voller, An Enthalpy Method for Modeling Dendritic Growth in a Binary Alloy, *Int J Heat and Mass Transfer*, **51**, 823-834, 2008
18. Qin Qian, Vaughan R.Voller and Heinz G. Stefan A vertical dispersion model for solute exchange induced by underflow and periodic hyporheic flow in a stream gravel bed, *Water Resources Research*, **44**, W07422, 2008.
19. R. Pardeshi, V. R. Voller, A. K. Singh and P. Dutta, An explicit-implicit time stepping scheme for solidification models, *Int. J. Heat Mass Transfer*, **51**, 3399-3409, 2008
20. V.R. Voller, A Numerical Method for the Rubinstein Binary-Alloy Problem in the Presence of an Under-cooled Liquid, *Int J. Heat and Mass Transfer*, **51**, 696-706, 2008
21. Qin Qian, Vaughan R.Voller and Heinz G. Stefan A vertical dispersion model for solute exchange induced by underflow and periodic hyporheic flow in a stream gravel bed, *Water Resources Research*, W07422, 2008.
22. J.B. Shaw, M.A. Wolinsky, C. Paola, and V.R. Voller, An image-based method for shoreline mapping on complex coasts, *Geophysical Research Letters*, **35**, L12405, 2008.
23. Qin Qian, H G. Stefan, V.R. Voller, A physically based flux limiter for QUICK calculations of advective scalar transport, *Int. J. Num Meth. Fluids*, **55**, 899-915, 2007
24. Horacio Toniolo, Gary Parker and Vaughan R Voller , Role of Ponded Turbidity Currents in Reservoir Trap Efficiency, *Journal of Hydraulic Engineering*, **133**, 579-595, 2007
25. Qin Qian, V.R. Voller, H G. Stefan, Modeling of solute transport into sub-aqueous sediments, *Applied Mathematical Modelling*, **31**, 1461-1478, 2007
26. Wonsuck Kim, John B. Swenson, Chris Paola, and Vaughan R. Voller, Shoreline response to autogenic processes of sediment storage and release in the fluvial system, *J. Geophys. Res.* **111**, F04013, 2006.

27. A. Jain, B.B. Guzina, and V.R. Voller, Effects of overburden on Joint Spacing in Layered Rocks, *Journal of Structural Geology*, **29**, 288-297, 2007
28. H. Toniolo, G. Parker, V. Voller, R.T. Beauboueff, "Depositional turbidity currents in diapiric minibasins on the continental slope: Experiments: numerical simulation and upscaling," *Journal of Sedimentary Research*, **76**, 2006.
29. Ali Ahmadi, Vaughan R Voller, and Michael J. Semmens, "Active flow through membrane-created biofilms: Modeling results," *J. Membrane Science*, **273**, 143-151, 2006.
30. C Paola and 9 co-authors including Vaughan Voller, "Toward a Unified science of the Earth's Surface: Opportunities for synthesis between hydrology, geomorphology and ecology," *Water Resource Research*, **42**, 2006.
31. V.R. Voller, "Modeling Microsegregation in Metal Alloys", *Materials Science Forum*, **508**, 349-360, 2006.
32. V.R. Voller, J. B. Swenson, W. Kim and C. Paola, "An enthalpy method for moving boundary problems on the earths surface," *Int. J. Heat and Fluid Flow*, **16**, 641-654, 2006.
33. V.R. Voller, A similarity solution for solidification of an under-cooled binary alloy, *Int. J. Heat Mass Transfer*, **49**, 1981-1985, 2006.
34. Chris Paola and Vaughan Voller. "A generalized Exner equation for sediment mass balance" *JGR-Earth Surface*, **110**, 2005.
35. Wonsuck Kim, Chris Paola, Vaughan R. Voller and John B. "Swenson Experimental Measurement of the Relative Importance of Controls on Shoreline Migration," *Journal of Sedimentary Research*, **76**, 270-283, 2006.
36. John Swenson, Chris Paola, Lincoln Pratson, Vaughan Voller, A. Brad Murray. "Fluvial and marine controls on combined subaerial and subaqueous delta progradation: Morphodynamic modeling of compound-clinoform development," *JGR* , **110**, 2005
37. V.R. Voller, "A Monte Carlo Scheme for Tracking Filling Fronts," *J. Comp. Phys.*, **200**, 399-411, 2004.
38. BB. Guzina, V.R. Voller, D.H. Timm "Crack Spacing in Strained Films," *Journal de Physique IV*, **120**, 201-208, 2004.
39. V.R. Voller, J.B Swenson, and C. Paola, "An Analytical Solution for A Stefan Problem with Variable Latent Heat," *Int. J. Heat Mass Trans.*, **47**, 5387-5390, 2004.
40. V. Lima-Vivancos and V. R. Voller, " Numerical Methods for Modeling Variably Saturated Flow in Layered Media," *Vadose Zone Journal* **3**, 1003-1037, 2004.

41. Marasteanu, M. O., Basu, A., Hesp, S, Voller, V., "Time-Temperature Superposition and AASHTO MP1a Critical Temperature for Low-Temperature Cracking," *International Journal of Pavement Engineering* **5**, 31-38, 2004.
42. I.L. Ferreira, Carlos. A. Santos, V. R. Voller and A. Garcia , "Analytical, Numerical and Experimental Analysis of Inverse Macrosegregation during Upward Unidirectional Solidification of Al-Cu Alloys," *Met Trans B* **35**, 285-297 2004.
43. V.R. Voller, A. Mouchmov and M. Cross, "An Explicit Method for Coupling Temperature and Concentration Fields in Solidification Models," *Applied Mathematical Modelling*, **28**, 79-94, 2004.
44. D.H. Timm, B.B. Guzina, and V.R. Voller, "Prediction of Thermal Cracking," *Int. J. Solids and Structures* **40**, 125-142, 2003.
45. D.H. Timm, D.H. and V.R. Voller, "Field Validation and Parametric Study of a Thermal Crack Spacing Model," *Journal of the Association of Asphalt Paving Technologists*, Vol. 72, 2003, pp. 356-387.
46. V.R. Voller and F. Porte-Agel, "Moore's Law and Numerical Modeling," *J. Comp. Phys* **179**, 698-703, 2002.
47. Zhang, X., V. R. Voller, K. A. Stelson, M. Bhattacharya, X. Cheng and A. Sen, "An Approximate Model of Thermal Residual Stress in an Injection Molded Part," *Journal of Thermal Stresses* **25**, 523-538, 2002.
48. A. Sen, M. Bhattacharya, K. A. Stelson, and V. R. Voller, "Injection Molded Starch/Synthetic Polymer Blends," *Materials Science and Engineering A*. **338**, 60-69, 2002
49. J.S. Gulliver, V.R. Voller, and D.E. Hibbs, "Modeling oil spills on river systems: Evaluation of aqueous concentrations," *Handbook of Environmental Engineering*, MacGraw Hill, 2002.
50. D. H. Timm, V.R. Voller, E-B. Lee and J. Harvey, "CALCOOL: A Multi-Layer Asphalt Pavement Cooling Tool for Temperature Prediction During Construction," *International Journal of Pavement Engineering* **2**, 169-185, 2001.
51. V.R. Voller, "On a General Back-Diffusion Parameter," *Journal of Crystal Growth* **226**, 562-568, 2001.
52. V.R. Voller, "Numerical treatment of rapidly changing and discontinuous conductivities," *Int J Heat Mass Transfer* **44**, 4553-4556, 2001.
53. J.G. Marr, J. Swenson, C. Paola and V.R. Voller, "Multi-diffusional Model of Fluvial Stratigraphy in Closed Depositional Basins," *Basin Research* **12**, 381-398, 2000.

54. J. Swenson, V.R. Voller, C. Paola, G. Parker and J.G. Marr, "Fluvio-Deltatic Sedimentation: A Generalized Stefan Problem," *European Journal of Applied Mathematics* 11, 433-452, 2000.
55. V.R. Voller, "A Model of Microsegregation During Binary Alloy Solidification," *Int. J. Heat and Mass Transfer* 43, 2047-2052, 2000.
56. J.A. Luoma and V.R. Voller "An Explicit Scheme for Tracking the Filling Front during Polymer Mold Filling," *Applied Mathematical Modeling* 24, 575-590, 2000.
57. N.J. Essila, M.J. Semmens and V.R. Voller, "Biofilms on Gas Permeable Membrane and Solid Supports: 1. Concentration and Activity Profiles" *Journal of Environmental Engineering* 126, 250-257, 2000.
58. V.R. Voller and C. Beckermann, "Approximate Models of Microsegregation with Coarsening," *Met Trans A* 30, 3016-3020, 1999.
59. V.R. Voller and C. Beckermann, "A Unified Model of Microsegregation and Coarsening", *Met Trans A* 30, 2183-2189, 1999.
60. V.R. Voller, "A Semi-Analytical Model of Microsegregation in a Binary Alloy," *Journal of Crystal Growth* 197, 325-332, 1999.
61. V.R. Voller, "A Semi-Analytical Model of Microsegregation and Coarsening in a Binary Alloy," *Journal of Crystal Growth* 197, 333-340, 1999.
62. V.R. Voller, J.F. Watson and S. Hoover, "The use of Multimedia in Developing Undergraduate Engineering Courses", JOM-e, May 1998, *Journal of Metals* 50, 2, 1998 or <http://www.tms.org/pubs/journals/JOM/9805/Voller> 1998.
63. R. De Sombre, D.E. Newcombe, B. Chadbourn and V.R. Voller, "Parameters to Define the Laboratory Temperature Range of Hot-Mix Asphalt," *Asphalt Technology* 67, 1998.
64. D.E. Hibbs. Y.F. Chen. J.S. Gulliver and V.R. Voller, "An Aqueous Concentration Model for Riverine Spills." *Journal of Hazardous Materials* 64, 37-53, 1999.
65. V.R. Voller, "A Numerical Scheme for Solidification of an Alloy." *Can. J. Met. Quart.* 37, 169-177, 1998.
66. J.M. Berg and V.R. Voller, "Adaptive Identification and Control of a Liquid Composite Molding Process." *Applied Mathematical Modeling* 22, 207-218, 1998.
67. V.R. Voller, "Estimating the Last Point to Solidify in a Casting." *Numerical Heat Transfer* 33, 417-432, 1998.
68. C.R Swaminathan and V.R. Voller, "Towards a General Numerical Method for Analysis of Solidification Systems," *Int. J. Heat Mass Transfer* 40, 2859-2868, 1997.

69. V.R. Voller, "A Similarity Solution for the Solidification of Multicomponent Alloys," *Int. J. Heat Mass Transfer* 40, 2869-2877, 1997.
70. M. Fabbri and V.R. Voller, "The Phase-Field Method in the Sharp-Interface Limit: A Comparison Between Model Potentials," *J. Computational Physics* 130, 256-265, 1997.
71. S. Sundarraj and V.R. Voller, "Computational Issues in Using a Dual Scale Model or the Segregation Process in a Binary Alloy," *Int. J. Num. Meth. in Heat and Fluid Flow* 7, 181-199, 1997.
72. Y-F. Chen, V.R. Voller, K.A. Stelson, "Prediction of Filling Time and Vent Locations for Resin Transfer Molding," *J. Composite Materials* 31, 1141-1161, 1997.
73. V.R. Voller, S. Peng and Y-F. Chen, "Numerical Solutions of Transient Free Surface Problems in Porous Media," *Int. J. Num. Meth. Eng.* 39, 2889-2906, 1996.
74. V.R. Voller and Y.F. Chen, "Prediction of Filling Times of Porous Cavities," *Int. J. Num. Meth. Fluid Flow* 23, 661-672, 1996.
75. J. Luoma and V.R. Voller, "A Demonstration of an Implicit Time Integration Scheme for Simulating the Filling of Porous Molds," *Visualization of Engineering Research* 1, 1996.
76. V.R. Voller, "An Overview of Numerical Methods for Phase Change Problems," *Advances in Numerical Heat Transfer* 1, 341-375, 1996.
77. Y-F. Chen, V.R. Voller and K.A. Stelson, "Time-Implicit Fixed and Deforming Grid Solutions for Compression Mold Filling," *Polymer Composites* 17, 414-422, 1996.
78. V.R. Voller, P. Felix and C.R. Swaminathan, "Cyclic Phase Change with Fluid Flow," *Int. J. Num. Meth. Heat Fluid Flow* 6, 57-64, 1996.
79. V.R. Voller and S. Peng, "An Algorithm for Analysis of Polymer Filling of Molds," *Polymer Engineering and Science* 35, 1758-1765, 1995.
80. V.R. Voller and S. Sundarraj, "A Model of Inverse Segregation: The Role of Microporosity," *Int. J. Heat Mass Transfer* 38, 1009-1018, 1995.
81. M. Fabbri and V.R. Voller, "Numerical Solution of Plane Front Solidification with Kinetic Undercooling," *Numerical Heat Transfer B* 27, 467-486, 1995.
82. V.R. Voller and S. Peng, "An Enthalpy Formulation on an Arbitrarily Deforming Mesh for Solution of the Stefan Problem," *Computational Mechanics* 14, 492-502, 1994.
83. Nihar K. Nanda, Karl A. Smith, Kenneth F. Haberle and Vaughan Voller, "A Knowledge-Based Computer Tool for Design or Casting Manufacturing Processes," *Journal of Metals* 46, 27-30, 1994.



84. S. Sundarraaj and V.R. Voller, "Effect of Macro Scale Phenomena on Microsegregation," *Int. Comm. Heat Mass Transfer* 21, 189-198, 1993.
85. C.R. Swaminathan and V.R. Voller, "A Time-Implicit Filling Algorithm," *Applied Mathematical Modeling* 18, 101-108, 1993.
86. V.R. Voller and Suresh Sundarraaj, "Modeling of Microsegregation," *Mat. Sci. and Tech.* 9, 474-481, 1993.
87. V.R. Voller and C.R. Swaminathan, "The Treatment of Discontinuous Thermal Conductivity in Control Volume Solutions of Phase Change Problems," *Numerical Heat Transfer B* 24, 161-180, 1993.
88. C.R. Swaminathan and V.R. Voller, "On the Enthalpy Method" *Int. J. Num. Meth. Heat and Fluid Flow* 3, 233-244, 1993.
89. C.R. Swaminathan, V.R. Voller and S.V. Patankar, "A Streamline Upwind Control Volume Finite Element Method for Modeling Fluid Flow and Heat Transfer Problems" *Finite Elements in Analysis and Design* 13, 169-184, 1993.
90. Suresh Sundarraaj and V.R. Voller, "The Binary Alloy Problem in an Expanding Domain : The Microsegregation Problem," *Int. J. Heat Mass Transfer* 36, 713-723, 1993.
91. C.R. Swaminathan and V.R. Voller, "A General Enthalpy Method for Modeling Solidification Processes," *Met. Trans. B* 23, 651-664, 1992.
92. C.R. Swaminathan and V.R. Voller, "A Streamline Upwind Scheme for Control Volume Finite Elements : 1. Formulations," *Numerical Heat Transfer B* 22, 95-107, 1992.
93. C.R. Swaminathan and V.R. Voller, "A Streamline Upwind Scheme for Control Volume Finite Elements : 2. Comparison with the SUPG Finite Element Scheme," *Numerical Heat Transfer B* 22, 109-124, 1992.
94. V.R. Voller, A.D. Brent, Ken-Chin Purcell and Chander Prakash, "Macrosegregation in a Binary Solidification System," *Int. Video Journal of Research in Engineering* 1, 97-106, 1992.
95. V.R. Voller and C.R. Swaminathan, "Fixed Grid Solutions of Phase Change Problems," *Journal of Theoretical and Applied Mechanics (Bulgarian Academy of Sciences)* 2, 30-40, 1992.
96. V.R. Voller, "Enthalpy Method for Inverse Stefan Problems," *Numerical Heat Transfer B* 21, 41-56, 1992.

97. V. R. Voller, "Some Comments on: Benchmark Problems and Testing of a Finite Element Code for Solidification in Investment Casting," Letter to the Editor, *Int. J. Num. Meth. Eng.* 33, 213-216, 1992.
98. A.T. Chronopoulos, C. Swaminathan and V.R. Voller, "The Stefan Problem Solved via Conjugate Gradient like Iterative Methods on a Parallel Vector Machine," *J. Super. Comp.* 5 74-91, 1991.
99. B. Minaie, K. Stelson, V.R. Voller, "Analysis of Flow Patterns and Solidification Phenomena in Die Casting Process," *J. Eng. Mech. Tech.* 113, 296-302, 1991.
100. V.R. Voller and C.R. Swaminathan, "A General Source Based Method for Solidification Phase Change," *Numerical Heat Transfer B* 19, 175-189, 1991.
101. D.E. Simpson, V.R. Voller and M.G. Everett, "An Efficient Algorithm for Mineral Processing Data Adjustment," *Int. J. Min. Processing* 31, 73-96, 1991.
102. V.R. Voller, "A Fast Implicit Finite Difference Method for the Analysis of Phase Change Problems," *Numerical Heat Transfer B* 17, 155-169, 1990.
103. V.R. Voller, A.D. Brent and C. Prakash, "Modeling the Mushy Region in a Binary Alloy," *Applied Mathematical Modeling* 14, 320-326, 1990.
104. V.R. Voller, C.R. Swaminathan and B.G. Thomas, "Fixed Grid Techniques for Phase Change Problems: A Review," *Int. J. Num. Meth. Eng.* 30, 875-898, 1990.
105. M. Lacroix and V.R. Voller, "Finite Difference Solutions of Solidification Phase Change Problems: Transformed vs. Fixed Grids," *Numerical Heat Transfer* 17, 25-42, 1990.
106. M. Rappaz and V.R. Voller, "Modeling of Micro-Macrosegregation in Solidification Processes," *Met. Trans. A* 21, 749-753, 1990.
107. J. Nopakun, H.H. Messer and V.R. Voller, "Fluorite Absorption from the Gastrointestinal Tract of Rats," *Journal of Nutrition* 119, 1411-1417, 1989.
108. V.R. Voller, A. Brent and C. Prakash, "The Modeling of Heat, Mass and Solute Transport in Solidification Systems," *Int. J. Heat Mass Transfer* 32, 1719-1731, 1989.
109. C. Prakash and V.R. Voller, "On the Numerical Solution of Continuum Mixture Model Equations Describing Binary Solid-liquid Phase Change," *Numerical Heat Transfer B* 15, 171-189, 1989.
110. V.R. Voller, "Development and Application of a Heat Balance Integral Method for Analysis of Metallurgical Solidification," *Applied Mathematical Modeling* 13, 3-11, 1989.

111. S.E. Hibbert, N.C. Markatos and V.R. Voller, "Computer Simulation of Moving Interface Convective Phase Change Processes," *Int. J. Heat Mass Transfer* 31, 1785-1795, 1988.
112. A.D. Brent, V.R. Voller and K.J. Reid, "The Enthalpy Porosity Technique for Modeling Convection-Diffusion Phase Change: Application to the Melting of a Pure Metal," *Numerical Heat Transfer* 13, 297-318, 1988.
113. D.E. Simpson, M.G. Everett and V.R. Voller, "Reducing the Number of Unknowns in a Constrained Minimization Problem: An Application to Material Balances," *Applied Mathematical Modeling* 12, 204-121, 1988.
114. D. Morin, M. Cross, V.R. Voller, B. Douglas and R. Delong, "Biophysical Stress Analysis of Restored Teeth: Modeling and Analysis," *Dental Materials* 4, 77-84, 1988.
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116. K. Fenech, M. Cross and V.R. Voller, "Numerical Modeling of the Cohesive Zone Formation in the Iron Blast Furnace," *PCH* 9, 71-84, 1987.
117. V. R. Voller, "A Heat Balance Integral Method Based on an Enthalpy Formulation," *Int. J. Heat Mass Transfer* 30, 604-607, 1987.
118. V.R. Voller, "An Implicit Enthalpy Solution for Phase Change Problems: With Application to a Binary Alloy Solidification," *Applied Mathematical Modeling* 11, 110-116, 1987.
119. V.R. Voller, M. Cross and N. Markatos, "An Enthalpy Method for Convection Diffusion Phase Change," *Int. J. Num. Meth. Eng.* 24, 271-284, 1987.
120. V.R. Voller, "A Heat Balance Integral Method for Estimating Practical Solidification Parameters," *IMA J. Applied Mathematics* 35, 223-232, 1985.
121. V.R. Voller, "Implicit Finite-Difference Solutions of the Enthalpy Formulation of Stefan Problems," *IMA J. Num. Anal.* 5, 201-214, 1985.
122. B. Knight, R. Endersby and V.R. Voller, "The Use of Expert Systems in Industrial Control," *Measurement and Control* 17, 409-413, 1985.
123. V.R. Voller and B. Knight, "Expert systems," *Chemical Engineering* 92, 93-96, 1985.
124. V.R. Voller and L. Shadabi, "Enthalpy Methods for Tracking a Phase Change Boundary in Two Dimensions," *Int. Comm. in Heat Mass Transfer* 11, 239-249, 1984.

125. V.R. Voller, M. Cross and D. Merrick, "Mathematical Models of Thermal Decomposition of Coal 5: Distribution of Gas Flow in a Coke Oven Charge," *Fuel* 62, 562-566, 1983.
126. V.R. Voller and M. Cross, "A Model of Thermally Induced Strain Development in Coke Oven Walls During Carbonization," *Mathematical Modeling* 3, 279-291, 1983.
127. J.J. Moore, N.A. Shah and V.R. Voller, "The Control of Channel Segregation in Cast Steels - A Review," *AFS Transactions* 83-08, 297-302, 1983.
128. V.R. Voller, J.J. Moore and N.A. Shah, "Modification of the Mathematical Analysis and Related Physical Description Used to Describe Channel Type Segregation," *Metals Technology* 10, 81-84, 1983.
129. V.R. Voller, "A Note on the Energy Size Reduction Relationship in Comminution," *Powder Technology* 36, 281-286, 1983.
130. V.R. Voller and P.J. Ryan, "Automated Material Balance and Assay Adjustment Around a Piece of Mineral Processing Equipment," *Int. J. Min. Processing* 10, 273-288, 1983.
131. V.R. Voller, "Interpretations of the Enthalpy in a Discretised Multidimensional Region Undergoing a Phase Change," *Int. Comm. in Heat Mass Transfer* 10, 323-328, 1983.
132. V.R. Voller and M. Cross, "An Explicit Numerical Method to Track a Moving Phase Change Front," *Int. J. Heat Mass Transfer* 26, 147-150, 1983.
133. K.J. Reid and V.R. Voller, "An Algorithm for Reconciling Hydrocyclone Size Data," *Chemical Engineering* 90, 43-44, 1983.
134. V.R. Voller and M. Cross, "Estimating the Solidification/Melting Times of Cylindrically Symmetric Regions," *Int. J. Heat Mass Transfer* 24, 1457-1462, 1981.
135. V.R. Voller and M. Cross, "Accurate Solutions of Moving Boundary Problems Using the Enthalpy Method," *Int. J. Heat Mass Transfer* 24, 545-556, 1981.

### **Books, Chapters in Books, and Edited Proceedings**

1. V.R. Voller, Basic Control Volume Finite Element Methods For Fluids and Solids, World Scientific, 2009.
2. V.R. Voller, "Numerical Methods for Phase Change Problems," Chapter 19 in *Hand Book for Numerical heat Transfer*, Wiley, 2006.
3. V.R. Voller (Editor): Selected papers from ECCOMAS 2004, Special Issue of *Int. J. Num Method in Heat and Mass Transfer* 16, 2006

4. N.El-Kaddah and V.R. Voller, Guest Editors, *Applied Mathematical Modeling*, 28, 2004.
5. V.R. Voller and H. Henein, "Materials Processing in the Computer Age III," TMS, Warrendale , 2000
6. V.R. Voller and K.K.Tamma (Guest Editors) "Numerical Methods in Thermal Problems," special issue of *International Journal Numerical Methods in Heat and Fluid Flow*, 9, 209-380, 1999
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8. B. Chadbourn, J.A.Luoma, D.E. Newcomb and V.R. Voller, "Consideration of Hot-Mix Asphalt Thermal Properties During Compaction," Quality Management of Hot-Mix Asphalt, ASTM STP 1299, 1996
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11. V.R. Voller, "Solidification," Chapter 9, Free and Moving Boundary Problems, (eds L.C. Wrobel and C.A. Brebia) Elsevier Applied Science, London, 1993.
12. V.R. Voller and M. Cross, "Solidification Processes-Algorithms and Codes," Mathematical Modeling for Materials Processing, (eds. M. Cross, J.F.T. Pittman, R.D. Wood) IMA 42, Clarendon Press, Oxford, 1993.
13. V.R. Voller, M.S. Stachowicz and B.G. Thomas, Materials Processing in the Computer Age, TMS, Warrendale, 1991
14. V.R. Voller and B. Knight, "An Exploration of the Applicability of Production Rule-Based Techniques to Process Modeling" Chapter VII.1., Modeling and Simulation Methodology in the Artificial Intelligence Era, (eds M.S. Elzas et al.) North Holland, Amsterdam 1987.
15. V.R. Voller and M. Cross, "Applications of Control Volume Enthalpy Methods in the Solution of Stefan Problems," Chapter 10, Computational Techniques in Heat Transfer, (eds R.W. Lewis et al.) Pineridge Press Swansea, 1985.

## **Keynote and Invited Presentations**

1. Numerical, Heat Transfer Modes of Geological Systems, Computational Methods in thermal problems Naples, Italy, 2009
2. Modeling of Delta Building Processes, Indian Institute of Science, Century Conference, 2008
3. Modeling of Micro-segregation in Metal Alloys. Fourth International Conference on Solidification and Gravity (one of 5 Invited Lectures ~140 papers presented), Hungary, 2004
4. Moving Boundary Problems in Earth-Surface Dynamics. Moving Boundaries 2003, November 2003. (one of 8 invited papers).
5. "Micro-macro Modeling of Solidification Processes and Phenomena." Computational Modeling of Materials, Minerals and Metals Processing, Seattle March 2002. [1 of 6 Keynotes]
6. "Modeling Micro Scale Phenomena for Application in Solidification Process Simulations." Processing Materials for Properties, San Francisco, 2000 [Session Key Note].
7. "Computational Modelling of Free and Moving Boundary Problems." Fifth International Conference on Moving Boundaries, Ljubljana, Slovenia, June 1999 [Closing Key Note]
8. "Solidification Processes-Algorithms and Codes." IMA Conference on Mathematical Modeling of Materials Processing, Bristol, U.K., July, 1991. [1 of 5 Keynotes].
9. "Fixed Grid Solutions of Phase Change Problems." THD-91 International Conference on Fluid Flow in Materials Production., Sofia, Bulgaria, August, 1991. [1 of 5 Keynotes].
10. "The Numerical Treatment of Moving Boundary Problems Arising from the Analysis of Metallurgical Processes." International Conference on Free and Moving Boundaries, Southampton, U.K., July 1991 [1 of 5 Keynotes].
11. "An Overview of the Modeling of Heat and Fluid Flow in Solidification Systems." Presented at the International conference on Modeling of Casting and Welding, Davos Switzerland, September, 1990 [1 of 5 Keynotes].
12. "Numerical Modeling of Solidification Phase Change Systems," Presented at Heat Transfer in Phase-Change Problems (EUROTHERM 6), Delft, Netherlands, 1988. [Single Keynote].