Bruce Thomas Murray

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Education

Ph.D., Mechanical Engineering(Applied Mathematics, Minor), Univ. of Arizona, 1986.

M.S., Mechanical Engineering, Rutgers University, 1980.

B.S., Mechanical Engineering, Rutgers University, 1978.

Professional Experience

Bartle Professor, Department of Mechanical Engineering, Binghamton University; 9/22–present.

Visiting Research Faculty, Vellore Institute of Technology, 9/19–present.

Chairman, Department of Mechanical Engineering, Binghamton University; 7/19–8/22..

Visiting Researcher, CDRH/OSEL Division of Applied Mechanics, U.S. Food and Drug Administration; 9/16-9/17.

Director of Undergraduate Studies, Department of Mechanical Engineering, Binghamton University; 8/14–8/16.

Chairman, Department of Mechanical Engineering, Binghamton University; 6/13–8/14.

Visiting Teaching Faculty, Vishwakarma Institute of Technology, Pune, India; 1/13.

Director of Undergraduate Studies, Department of Mechanical Engineering, Binghamton University; 9/06–5/09; 6/10–9/11.

Professor, Mechanical Engineering, Binghamton University; 9/06–present.

Visiting Faculty Research Fellow, Oden Institute for Computational Engineering and Sciences, University of Texas at Austin; 8/04–8/11.

Founding Director, Materials Engineering Program, Binghamton University, 11/01–8/04.

Associate Professor, Mechanical Engineering, Binghamton University; 9/00–8/06.

Guest Researcher, Mathematical and Computational Sciences Division, National Institute of Standards and Technology, Gaithersburg, Md.; 10/97–9/02.

Assistant Professor, Mechanical Engineering, Binghamton University; 8/97–8/00.

Research Engineer, Mathematical and Computational Sciences Division, National Institute of Standards and Technology, Gaithersburg, Md.; 10/88–6/97.

Assistant Professor, Department of Mechanical Engineering and Mechanics, Lehigh University; 9/86–8/88.

Research Assistant, Aerospace and Mechanical Engineering Department, University of Arizona, Tucson, Ariz.; 6/83–8/86.

Member of Technical Staff, Bell Laboratories, Holmdel, N.J.; 8/80–6/82.

Research Interests

Computational Modeling in Mechanobiology

Thermal Modeling Related to Electronics Packaging

Heat and Mass Transfer in Electrical Energy Storage Systems

Numerical Methods for Free and Moving Boundary Problems

Computational Materials Science and Engineering

Courses Taught

ME 331 Thermodynamics (undergrad)
ME 351 Fluid Mechanics (undergrad)
ME 361 Manufacturing Processes (undergrad)
ME 403/303 Engineering Computational Methods (undergrad)
ME 406 Engineering Sustainable Energy (undergrad)
ME 435 Aerodynamics (undergrad)
ME 491 Mechanical Engineering Lab (undergrad)
ME 498/499 Senior Project (Project Advisor)
ME 535 Analytical Methods I (grad)
ME 536 Numerical Methods (grad)
ME 541 Computational Fluids and Heat Transfer (grad)
ME 550 Fluid Mechanics (grad)
ME 571 Manufacturing Processes (grad)
ME 580C Computational Materials (grad)
MSE 564 Transport Phenomena in Materials Processing (grad)

Honors and Awards

Chancellor's Award for Excellence in Service, 2020.

Chancellor's Award for Excellence in Teaching, 2010.

J. Tinsley Oden Faculty Research Fellowship, University of Texas, Austin, 2005 & 2010.

Outstanding Paper Award International Journal of Numerical Methods for Heat & Fluid Flow

NRC Postdoctoral Research Fellowship; 1988 – 1990.

University Graduate Fellowship, University of Arizona; 1982 – 1985.

Member of Sigma Xi, Tau Beta Pi and Pi Tau Sigma Honor Societies.

B.S. Degree awarded with Highest Honors, 1978.

Professional Activities

A) Current and Past Professional Society Memberships

American Physical Society

Biomedical Engineering Society

American Society of Engineering Education

Society of Automotive Engineers

American Society of Mechanical Engineers

Society for Industrial and Applied Mathematics

B) Editor and Referee

Member of the Editorial Board, Journal of Fluid Dynamics & Materials Processing

Proposal Reviewer for National Science Foundation

Proposal Reviewer for National Research Council

Proposal Reviewer for NASA and NIST

Paper Referee for Physical Review Fluids

Paper Referee for Physics of Fluids

Paper Referee for the Journal of Fluid Mechanics

Paper Referee for the Journal of Computational Physics

Paper Referee for Computational Methods in Applied Mechanics

Paper Referee for the Journal of Crystal Growth

Paper Referee for the International Journal for Numerical Methods in Engineering

Paper Referee for Met. and Mater. Transactions

Paper Referee for the ASME Journals and Conference Proceedings

Paper Referee for IEEE Transactions on Components, Packaging and Manufacturing Technology

Paper Referee for the International Journal for Heat and Mass Transfer

Paper Referee for the Journal of Electronics Packaging

Paper Referee for the Journal of Engineering Mathematics

Paper Referee for the International Journal of Thermal Sciences

Paper Referee for Applied Energy

Paper Referee for Modern Physics Letters B

Paper Referee for Physical Review E

Paper Referee for the Journal of Food Process Engineering

C) Conference Participation

Session Organizer, 2011 IEEC Electronics Packaging Symposium

Panel Member, Integration of Simulation Technology into Engineering Curricula Workshop, Cornell University, Ithaca, NY, July 2011.

Current Research Grants

Mechanobiology of Myofibroblast Behavior in Health and Disease, NSF-CMMI, Co-PI (PI G. Mahler), Funding Period 9/19-8/23.

Partial List of Past Research Grants

Energy Efficient Electronic Systems, NSF-IUCRC, Co-PI (PI K. Ghose), Funding Period 9/11-3/19.

Endothelial to Mesenchymal Transformation Mechanobiology, NSF-CMMI, Co-PI (PI G. Mahler), Funding Period 9/14-8/18.

Development of a Fully-Instrumented Self-Sensing and Self-Regulating Data Center, NSF-MRI, Co-PI (PI K. Ghose), Funding Period 10/10-8/14.

The Development of a Unique Experimental and Computational Modeling Approach for Studying Cellular Transformations Related to Cancer, Research Foundation of the State University, of New York, Co-PI (PI P. Huang), Funding Period 5/12-4/13.

Chip-Package Interactions on 3D-IC Learning Vehicle, Empire State Development Corp., Co-PI (PI SB Park), Funding Period 6/12-3/13.

Modeling Processing and Thermal Properties of Novel Materials for use in Electronics Packaging Applications, Integrated Electronics Engineering Center, New York State Center of Advanced Technology, PI, Funding Period 7/10-6/11.

Experimental Characterization and Sequential Multi-Scale Modeling of Reactive Wetting, NSF-DMR, Co-PI (PI T.J. Singler), Funding Period 9/06-1/11.

Verified Predictive Modeling Tools for Chemical, Biological and Enviromental Hazards Dispersion in the Atmosphere, Co-PIs B. T. Murray, B. Sammakia, Defense Threat Reduction Agency, DHS, Funding Period 2005-2008.

Integration of Polymer/Plastics Technologies across the Curriculum, NSF-CCLI, Co-PI (PI - E.S. Stevens, Chemistry), Funding Period 2003-2005.

Convective and Morphological Instabilities During Crystal Growth, NASA Microgravity Materials Science, Co-PI (PI - G. B. McFadden), Funding Period 2000-2003.

An Experimental and Theoretical Study of Reactive Wetting in Low Melting Point Alloys, NSF-DMR, PI, Funding Period 1999-2002.

Coupled Growth in Hypermonotectics, Subcontract to NASA/MSFC NAS8-99059 through the University of Alabama at Birmingham (PI - J.B. Andrews), Funding Period 1999-2003.

Nonlinear Calculations of Thermosolutal Convection during Directional Solidification, NIST/Materials Science and Engingeering Laboratory, PI, Funding Period 1998-2001.

Reliability of Lead-Free Solder Joints with Different Metallizations in Microelectronic Interconnects, Integrated Electronics Engineering Center, SUNY at Binghamton, Co-PI with E.J. Cotts (Physics Department), Funding Period 1999-2000.

Wetting of Lead-Free Solders for Microelectronic Interconnects Technologies, Integrated Electronics Engineering Center, SUNY at Binghamton, Co-PI with T.J. Singler, Funding Period 1998-2000.

Interface Morphology during Crystal Growth: Effects of Anisotropy and Fluid Flow, NASA, Microgravity Fluid Physics, Co-PI (PI - S. R. Coriell), Funding Period 1996-99.

Patents

Devices and Fluid Flow Methods for Improving Mixing, Bhopte S., Sammakia B. and Murray B., U.S. Patent Number: 8,277,112

Publications

A) Archival Journals(Over 4000 Citations on Google Scholar)

1. B.T. Murray and C.F. Chen, Double-diffusive convection in a porous medium, *Journal of Fluid Mechanics*, **201**, pp. 147-166, 1989.
2. K.D. Stephanoff, J.S. Perkins, and B.T. Murray, Mixing enhancement in flow past rectangular cavities as a result of periodically pulsed fluid motion, *IEEE Transactions on Components, Hybrids and Manufacturing Technology* **12**, pp. 766-771, 1989.
3. G.B. McFadden, B.T. Murray, and R.F. Boisvert, Elimination of Spurious Eigenvalues in the Chebyshev Tau Spectral Method, *Journal of Computational Physics*, **91**, pp. 228-239, 1990.
4. G.B. McFadden, S.R. Coriell, B.T. Murray, M.E. Glicksman, and M.E. Selleck, Effect of a Crystal-Melt Interface on Taylor-Vortex Flow, *Physics of Fluids A* **2**, pp. 700-705, 1990.
5. B.T. Murray, G.B. McFadden, and S.R. Coriell, Stabilization of Taylor-Couette Flow due to Time-Periodic Outer Cylinder Oscillation, *Physics of Fluids A*, **2**, pp. 2147-2156, 1990.
6. B.T. Murray, S.R. Coriell, and G.B. McFadden, The Effect of Gravity Modulation on Solutal Convection During Directional Solidification, *Journal of Crystal Growth*, **110**, pp. 713-723, 1991.
7. A. A. Wheeler, G.B. McFadden, B.T. Murray, and S.R. Coriell, Convective Stability in the Rayleigh Benard and Directional Solidification Problems: High Frequency Gravitational Modulation, *Physics of Fluids A*, **3**, pp. 2847-2858, 1991.
8. B. V. Saunders, B.T. Murray, G.B. McFadden, and S.R. Coriell, The Effect of Gravity Modulation of Thermosolutal Convection in an Infinite Layer of Fluid, *Physics of Fluids A*, **4**, pp. 1176-1189, 1992.
9. B.T. Murray, S.R. Coriell, G.B. McFadden, A.A. Wheeler, and B.V. Saunders, Gravitational Modulation of Thermosolutal Convection during Directional Solidification, *Journal of Crystal Growth*, **129**, pp. 70-80, 1993.
10. A.A. Wheeler, B.T. Murray and R.J. Schaefer, Computation of Dendrites Using a Phase Field Model, *Physica D*, **66**, pp. 243-262, 1993.

11. B.T. Murray, S.R. Coriell, G.B. McFadden, A.A. Wheeler, and The Effect of Gravity Modulation on Convection in Vertical Bridgman Growth, *Microgravity - Science and Technology*, **6**, pp. 70-73, 1993.

12. R.J. Braun, G.B. McFadden, B.T. Murray, S.R. Coriell, M.E. Glicksman, and M.E. Selleck, Asymptotic Behavior of Modulated Taylor-Couette Flows with a Crystalline Inner Cylinder, *Physics of Fluids A*, **5**, pp. 1891-1903, 1993.

13. A. A. Chernov, S.R. Coriell, and B.T. Murray, Morphological Stability of a Vicinal Face Induced by Step Flow, *Journal of Crystal Growth*, **132**, pp. 405-413, 1993.

14. S-L. Wang, R.F. Sekerka, A.A. Wheeler, B.T. Murray, S.R. Coriell, R.J. Braun, and G.B. McFadden, Thermodynamically-Consistent Phase-Field Models for Solidification, *Physica D*, **69**, pp. 189-200, 1993.

15. W. J. Boettinger, A.A. Wheeler, B.T. Murray, and G.B. McFadden, Prediction of Solute Trapping at High Solidification Rates Using a Diffuse Interface Phase-Field Theory of Alloy Solidification, *Mat. Sci. and Eng.*, **A178**, pp. 217-223, 1994.

16. S.R. Coriell, B.T. Murray, and A. A. Chernov, Kinetic Self-Stabilization of a Stepped Interface: Binary Alloy Solidification, *Journal of Crystal Growth*, **141**, pp. 219-233, 1994.

17. S. Van Vaerenbergh, S.R. Coriell, G.B. McFadden, B.T. Murray, and J. C. Legros, Modification of Morphological Stability by Soret Diffusion, *Journal of Crystal Growth*, **147**, pp. 207-214, 1995.

18. A. A. Chernov, S.R. Coriell, and B.T. Murray, Kinetic Self-Stabilization of a Stepped Interface: Growth into a Supercooled Melt, *Journal of Crystal Growth*, **149**, pp. 120-130, 1995.

19. A.A. Wheeler, N.A. Ahmad, W.J. Boettinger, R.J. Braun, G.B. McFadden, and B.T. Murray, Recent Developments in Phase-Field Models of Solidification, *Adv. Space Res.*, **16**, pp. 163-170, 1995.

20. R.J. Braun, B.T. Murray, W.J. Boettinger and G.B. McFadden, Lubrication Theory for Reactive Spreading of a Thin Drop, *Physics of Fluids*, **7**, pp. 1797-1810, 1995.

21. B.T. Murray, A.A. Wheeler, and M.E. Glicksman, Simulations of Experimentally Observed Dendritic Growth Behavior using a Phase-Field Model, *Journal of Crystal Growth*, **154**, pp. 386-400, 1995.

22. S.R. Coriell, B.T. Murray, A. A. Chernov and G.B. McFadden, Effects of Shear Flow and Anisotropic Kinetics on the Morphological Stability of a Binary Alloy, *Met. Mater. Trans.*, **27A**, pp. 687-694, 1996.

23. J.A. Warren and B.T. Murray, Ostwald Ripening and Coalescence of a Binary Alloy in Two Dimensions using a Phase-Field Model, *Modeling and Sim. in Matls Sci.*, **4**, pp. 215-229, 1996.

24. S.R. Coriell, B.T. Murray, A. A. Chernov and G.B. McFadden, Step Bunching on a Vicinal Face Growing in a Flowing Solution, *Journal of Crystal Growth*, **169**, pp. 773-785, 1996.

25. K. W. Moon, W. J. Boettinger, M. E. Williams, D. Josell, B.T. Murray, W. C. Carter, and C. A. Handwerker, Dynamics Aspects of Wetting Balance Tests, *J. Electronic Packaging*, **118**, pp. 174-183, 1996.

26. D. Josell, A. Cezairliyan, D. van Heerden, and B.T. Murray, Thermal Diffusion Through Multilayer Coatings: Theory and Experiment *NanoStructured Materials*, **9**, pp. 727-736, 1997.

27. R.J. Braun and B.T. Murray, Adaptive Phase-Field Computations of Dendritic Crystal Growth, *Journal of Crystal Growth*, **174**, pp. 41-53, 1997.

28. D. Josell, A. Cezairliyan, D. van Heerden, and B.T. Murray, An Integral Solution for Thermal Diffusion in Periodic Multilayer Materials: Application to Iron/Copper Films, *Int. J. Thermophysics*, **18**, pp. 865-885, 1997.

29. S.R. Coriell, W.F. Mitchell, B.T. Murray, J.B. Andrews, and Y. Arikawa, Analysis of Monotectic Growth: Infinite Diffusion in the L_2-Phase, *Journal of Crystal Growth*, **179**, pp. 647-657, 1997.

30. R.J. Braun, B.T. Murray, and J. Soto, Adaptive Finite-Difference Computations of Dendritic Growth Using a Phase-Field Model, *Modeling and Sim. in Matls Sci.*, **5** 365-380, 1997.

31. S.R. Coriell, A. A. Chernov, B.T. Murray, and G.B. McFadden, Step Bunching: Generalized Kinetics, *Journal of Crystal Growth*, **183**, pp. 669-682, 1998.

32. S.R. Coriell, B.T. Murray, A. A. Chernov, and G.B. McFadden, The Effect of Shear Flow on the Morphological Stability of a Vicinal Face: Growth from a Supersaturated Solution, *Adv. Space Res.*, **22**, pp. 1153-1158, 1998.

33. A.A. Wheeler and B.T. Murray, The Disturbance of Thermosolutal Convection by g-Jitter, *Microgravity - Science and Technology*, **11**, pp. 96-100, 1998.

34. B.T. Murray, S.R. Coriell, G.B. McFadden, and A. A. Chernov, The Effect of Oscillatory Shear Flow on Step Bunching, *Journal of Crystal Growth*, **218**, pp. 434-446, 2000.

35. S.R. Coriell, G.B. McFadden, W.F. Mitchell, B.T. Murray, J.B. Andrews, and Y. Arikawa, Effect of Flow due to Density Change on Eutectic Growth, *Journal of Crystal Growth*, **224**, pp. 145-54, 2001.

36. S. P. Watson, B.T. Murray, and B. G. Sammakia, Computational Parameter Study of Chip Scale Package Array Cooling, *IEEE Transactions on Components and Packaging Technologies*,**24**, pp. 184-190, 2001.

37. L.N. Brush and B.T. Murray, Crystal Growth with Applied Current, *Journal of Crystal Growth*, **250**, pp. 170-174, 2003.

38. C.S. Hogea, B.T. Murray and J.A. Sethian, Implementation of the level set method for continuum mechanics based tumor growth models, Fluid Dynamics and Materials Processing, **1**, pp. 109-130, 2005.

39. C.S. Hogea, B.T. Murray and J.A. Sethian, Simulating Complex Tumor Dynamics from avascular to vascular growth using a General Cartesian Mesh/Level Set Method, Journal of Mathematical Biology, **53**, pp. 86-134, 2006.

40. L. Yin, B.T. Murray and T.J. Singler, Dissolutive Wetting in the Sn-Bi System, Acta Mater., **54**, pp. 3561-3574, 2006.

41. J.W. Peterson, G.F. Carey, D.J. Knezevic and B.T. Murray, Adaptive Finite Element Methodology for Tumor Angiogenesis Modeling, International Journal for Numerical Methods in Engineering, **69**, pp. 1212-1238, 2007.

42. R.H. Stogner, G.F. Carey, and B.T. Murray, Approximation of Cahn-Hilliard diffuse interface models using parallel adaptive mesh refinement and coarsening with C^1 elements, International Journal for Numerical Methods in Engineering, **76**, pp. 636-661, 2008.

43. S. Su, L. Yin, Y. Sun, B.T. Murray and T.J. Singler, Modeling Dissolution and Spreading of Sn-Bi Alloy Drops on a Bi Substrate, Acta Mater.,**57**, pp. 3110-3122, 2009.

44. L. Yin, B.T. Murray, S. Su, Y. Sun, Y. Efraim, H. Taitelbaum and T.J. Singler, Reactive Wetting in Metal-Metal Systems, J. Phys.: Condens. Matter, **21**, art. 464130, 2009.

45. J.W. Peterson, B.T. Murray and G.F. Carey, Multi-Resolution Simulation of Double-Diffusive Convection in Porous Media, International Journal of Numerical Methods for Heat and Fluid Flow, **20**, pp. 37-65, 2010.

46. F. Zhou, P. Arunasalam, B.T. Murray and B. Sammakia, Modeling Heat Transport in Thermal Interface Materials Enhanced with MEMS based Microinterconnects, IEEE Transactions on Components and Packaging Technologies, **33**, pp. 16-24, 2010.

47. D.M. Anderson, G.B. McFadden, S.R. Coriell and B.T. Murray, The Solidification of an Ideal Ternary Alloy in a Mushy Layer, J. Fluid Mech., **647**, pp. 309-333, 2010.

48. D. Homentcovschi, B.T. Murray and R.N. Miles, An analytical formula and FEM computations for the viscous damping of a periodic perforated MEMS microstructure outside the lubrication approximation, Microfluidics and Nanofluidics, **9**, pp. 865-879, 2010.

49. S. Pisipati, J. Geer, B. Sammakia, B.T. Murray A Novel Alternate Approach for Multiscale Thermal Transport using Diffusion in the Boltzmann Transport Equation, International Journal of Heat and Mass Transfer, **54**, pp. 3406-3419, 2011.

50. M. Ibrahim, S. Bhopte, B. Sammakia, B.T. Murray, M. Iyengar, and R. Schmidt, Effect of Transient Boundary Conditions and Detailed Thermal Modeling of Data Center Rooms, IEEE Transactions on Components, Packaging and Technology, **2**, pp. 300-310, 2012. DOI: 10.1109/TCPMT.2011.2175926.

51. T.J. Singler, S. Su, L. Yin and B.T. Murray, Modeling and Experiments in Dissolutive Wetting: A Review, Journal of Materials Science, **47**, pp. 8261-8274, 2012. DOI: 10.1007/s10853-012-6622-9.

52. X. Xu, M.M. Myers, B. Sammakia and B.T. Murray, Thermal Modeling and Life Prediction of Water-Cooled Hybrid Concentrating PV/T Collectors, J. Solar Energy Engineering, **135**, Art. No. 011010, 2013, DOI:10.1115/1.4006965

53. X. Xu, M.M. Myers, B. Sammakia and B.T. Murray, Performance and Reliability Analysis of Hybrid Concentrating Photovoltaic/Thermal Collectors with a Tree-Shaped Channel Network Cooling System, IEEE Transactions on Components, Packaging and Manufacturing Technology, **3**, pp. 967-977, 2013.

54. S. Pisipati, J. Geer, B. Sammakia and B.T. Murray, Multiscale Thermal Device Modeling using Diffusion in the Boltzmann Transport Equation, International Journal of Heat and Mass Transfer, **64**, pp. 286-303, 2013.

55. Z. Song, B.T. Murray and B. Sammakia, A Compact Model for Data Center Analysis using the Zonal Method, Numerical Heat Transfer, Part A, **64**, pp. 361-377, 2013 DOI:10.1080/10407782.2013.784138.

56. Z. Song, B.T. Murray and B. Sammakia, Airflow and Temperature Distribution Optimization in Data Centers, using Artificial Neural Networks, International Journal of Heat and Mass Transfer, **64**, pp. 80-90, 2013.

57. D. Homentcovschi, B.T. Murray and R.N. Miles, Viscous damping of regularly perforated MEMS microstructures outside the lubrication approximation: optimum number of holes and the edge correction, Sensors and Actuators A, **201**, pp. 281-288, 2013.

58. Z. Song, B.T. Murray and B. Sammakia, Numerical Investigation of Inter-zonal Boundary Conditions for Data Center Thermal Analysis, International Journal of Heat and Mass Transfer, **68**, pp. 649-658, 2014.

59. Z. Song, B.T. Murray and B. Sammakia, A Dynamic Compact Thermal Model for Data Center Analysis and Control using the Zonal Method and Artificial Neural Networks, Applied Thermal Engineering, **62**, pp. 48-57, 2014.

60. Z. Song, B.T. Murray and B. Sammakia, Long-Term Transient Thermal Analysis using Compact Models for Data Center Applications, International Journal of Heat and Mass Transfer, **71**, pp. 69-78, 2014.

61. X. Xu, S. Zhou, M.M. Myers, B. Sammakia and B.T. Murray, Performance Analysis of a Combination System of Concentrating PV/T Collector and TEGS, Journal of Electronics Packaging, **136**, 041006:1-7, 2014.

62. T. Gao, B. Sammakia, B.T. Murray, A. Ortega and B. Schmidt, Cross Flow Heat Exchanger Modeling of Transient Temperature Input Conditions, IEEE Transactions on Components, Packaging and Technology, **11**, pp. 1796-1807, 2014.

63. T. Gao, B.T. Murray and B. Sammakia, Analysis of Transient and Hysteresis Behaviors of Cross Flow Heat Exchangers under Variable Fluid Mass Flow Rate for Data Center Cooling, Applied Thermal Engineering, **84**, pp. 15-26, 2015.

64. S.G. Mina, W. Wang, Q. Cao, P. Huang, B.T. Murray and G.J. Mahler, Shear stress magnitude and transforming growth factor-beta 1 regulate endothelial to mesenchymal transformation in a three-dimensional culture microfluidic device, RSC Advances, **6** 85457-85467, 2016.

65. K. Nemati, H.A. Alissa, B.T. Murray, B. Sammakia, R. Tipton and M. Seymour, Comprehensive Experimental and Computational Analysis of a Fully-Contained Hy-

brid Server Cabinet, Journal of Heat Transfer, **139**, 082101-12, 2017. DOI:10.1115/1.4036100

66. K. Nemati, H.A. Alissa, B.T. Murray, K. Schneebeli, and B. Sammakia. Experimental Failure Analysis of a Rear Door Heat Exchanger with Localized Containment. IEEE Components, Packaging and Manufacturing Technology, **7**, pp. 882-892, 2017. DOI: 10.1109/TCPMT.2017.2682863.
67. S. Dahal, P. Huang, B.T. Murray and G.J. Mahler, Endothelial to Mesenchymal Transformation is induced by Altered Extracellular Matrix in Aortic Valve Endothelial Cells, Journal of Biomaterials Research: Part A, **105**, pp. 2729-2741, 2017.
68. S.G. Mina, P. Huang, B.T. Murray and G.J. Mahler, The role of shear stress and altered tissue properties on endothelial to mesenchymal transformation and tumor-endothelial cell interaction, Biomicrofluidics, **11**, 044104, 2017.
69. S.A.R. Dibaji, S. Guha, A. Arab, B.T. Murray and M.R. Myers, Accuracy of Commercial Electric Nicotine Delivery Systems (ENDS) Temperature Control, PLOS one, November 5, 2018. https://doi.org/10.1371/journal.pone.0206937
70. D. Homentcovschi and B.T. Murray, Explicit resistance matrix for a Hall disk with multiple peripheral contacts: Application to a van der Pauw type method for extended contacts, Sensors and Actuators A, **294**, 2019. https://doi.org/10.1016/j.sna.2019.04.027
71. M. Chowkwale, G.J. Mahler, P. Huang and B.T. Murray, A Multiscale In Silico Model of Endothelial to Mesenchymal Transformation in a Tumor Microenvironment, J. Theoretical Biology, **480**, pp. 229-240, 2019. https://doi.org/10.1016/j.jtbi.2019.08.012
72. D. Homentcovschi and B.T. Murray, Basic relationships for Hall half-plane structures with multiple extended contacts on the boundary: Applications to the extraction of physical parameters and optimization of graphene and vertical Hall devices, Solid State Electronics, **171** 107837, 2020, https://doi.org/10.1016/j.sse.2020.107837
73. B. Bozorgmehr and B.T. Murray, Numerical Simulation of Evaporation of Ethanol-Water Mixture Droplets on Isothermal and Heated Substrates, ACS Omega, ao-2021-005455, 2021. https://doi.org/10.1021/acsomega.1c00545
74. Dorel Homentcovschi, Radu Oprea and Bruce T. Murray, Resistance matrix for an anisotropic Hall plate with multiple extended asymmetric contacts on the boundary, Journal of Applied Mathematics and Physics, **9**, pp. 1911-1925, 2021. https://doi.org/10.4236/jamp.2021.98125
75. S. Dahal, J. Bramsen, B. Alder, B.T. Murray, P. Huang, M.-H. Chen, G.J. Mahler, Chondroitin Sulfate Promotes Interstitial Cell Activation and Calcification in an *in Vitro* Model of the Aortic Valve, Cardiovascular Engineering and Technology, BMES 2021, https://doi.org/10.1007/s13239-021-00586-z
76. Dorel Homentcovschi, Romeo Bercia and Bruce T. Murray, Analysis of a Hall-Corbino disk plate having a point current source at the center, Solid State Electronics, **186**, 108179, 2021. https://doi.org/10.1016/j.sse.2021.108179

77. Dorel Homentcovschi and Bruce T. Murray, Determination of the Hall voltage for the case of a Hall plate having a piecewise constant Hall angle, ZAMP, **73**, 198, 2022. https://doi.org/10.1007/s00033-022-01836-3

78. J. Bramsen, B. Alder, Melissa Mendoza, B.T. Murray, M.-H. Chen, P. Huang, G.J. Mahler, Glycosaminoglycans affect endothelial to mesenchymal transformation, calcification and proliferation in a 3D model of aortic valve disease. Frontiers in Cardiovascular medicine, **29**, September 2022. https://doi.org/10.3389/fcvm.2022.975732

B) Refereed Conference Proceedings and Compilations

1. D.D. Knight and B.T. Murray, Theoretical Investigation of Interaction and Coalescence of Large Scale Structures in the Turbulent Mixing Layer, in *Lecture Notes in Physics* **136**, J. Jimenez, ed., (Springer-Verlag, New York, 1981), pp. 62–92.

2. K.J. Kennedy and B.T. Murray, Developing Forced Laminar Flow Between Parallel Planes with Local Heat Sources, Bell Laboratories Technical Memorandum, TM81-43423-5, 1981.

3. C.F. Chen and B.T. Murray, Double-Diffusive Convection in a Porous Medium, in *Double-Diffusive Motions*, **FED–24**, N.E. Bixler and E. Speigel, eds., (ASME, New York, 1985), pp. 47–55.

4. S.R. Coriell, G.B. McFadden, and B.T. Murray, Modeling of Double-Diffusive Convection in Vertical Bridgman Growth, in *Proc. VIIth European Symposium on Materials and Fluid Sciences in Microgravity*, **ESA SP–295**, B. Kaldeich, ed., (ESTEC, Noordwijk, 1989) pp. 199–207.

5. G.B. McFadden, B.T. Murray, S.R. Coriell, M.E. Glicksman, and M.E. Selleck, Effect of modulated Taylor-Couette flow on crystal-melt interfaces: theory and initial experiments, in *On the Evolution of Phase Boundaries*, The IMA Volumes in Mathematics and Its Applications, **43**, M.E. Gurtin and G.B. McFadden, eds., (Springer-Verlag, New York, 1992) pp. 81–100.

6. S.R. Coriell, B.T. Murray, G.B. McFadden, and A.A. Wheeler, B.V. Saunders, Convective and Morphological Instabilities during Crystal Growth: Effect of Gravity Modulation, in *Proc. Eighteenth International Symposium on Space Technology and Science*, Kagoshima, Japan, 1992, pp. 2155–2160.

7. B.V. Saunders, B.T. Murray, G.B. McFadden, S.R. Coriell, and A.A. Wheeler, The Effect of Gravity Modulation on Thermosolutal Convection, in *Proc. VIIIth European Symposium on Materials and Fluid Sciences in Microgravity*, **ESA SP-333**, B. Kaldeich, ed., (ESTEC, Noordwijk, 1992) pp. 237-241.

8. W. J. Boettinger, A.A. Wheeler, B.T. Murray, G.B. McFadden, and R. Kobayashi, A phase-field, diffuse interface solidification model for pure metals and binary alloys, in *Modeling of Coarsening and Grain Growth*, S. P. Marsh and C. Pande, eds., (The Minerals, Metals, & Materials Society, 1993).

9. G.B. McFadden, B.T. Murray, S.R. Coriell, M.E. Glicksman, and M.E. Selleck, Effect of a crystal-melt interface on Taylor-Vortex flow with buoyancy, in *Emerging Appli-*

cations in Free Boundary Problems, Pitman Research Notes in Mathematics, **280**, J.M. Chadam and H. Rasmussen, eds., (Longman Group UK, 1993) pp. 105–119.

10. G.B. McFadden, S.R. Coriell, and B.T. Murray, The Rayleigh instability for a cylindrical crystal-melt interface, in *Variational and Free Boundary Problems*, The IMA Volumes in Mathematics and Its Applications, **53**, A. Friedman and J. Spruck, eds., (Springer-Verlag, New York, 1993) pp. 159–169.
11. W. J. Boettinger, A.A. Wheeler, B.T. Murray, G.B. McFadden, and R. Kobayashi, Calculation of Alloy Solidification Morphologies Using the Phase-Field Method, in *Modeling of Casting, Welding, and Advanced Solidification Processes VI*, T. S. Piwonka, V. Voller and L. Katgerman, eds., (The Minerals, Metals, & Materials Society, 1993) pp. 79–86.
12. B.T. Murray, A.A. Wheeler, W. J. Boettinger, and G.B. McFadden, Computation of Dendritic Solidification Using a Phase-Field Model, in *Heat Transfer in Melting, Solidification, and Crystal Growth*, **HTD–234**, I.S. Habib and S. Thynell, eds., (ASME, New York, 1993) pp. 67–76.
13. S.R. Coriell, B.T. Murray, G.B. McFadden, and K. Leonartz, Convective and morphological stability during directional solidification of the succinonitrile-acetone system, in *Free Boundaries in Viscous Flows*, The IMA Volumes in Mathematics and Its Applications, **61**, R.A. Brown and S.H. Davis, eds., (Springer-Verlag, New York, 1994) pp. 99–112.
14. S.R. Coriell, A. A. Chernov, B.T. Murray, and G.B. McFadden, Convection and Morphological Stability during Directional Solidification, in *Proc. Second Microgravity Fluid Physics Conference*, CP-3276, (NASA, Wash. D.C., 1994).
15. A. A. Chernov, S.R. Coriell, and B.T. Murray, Morphological Stability of a Vicinal Face Induced by Liquid or Step Flow, in *Crystal Growth Mechanism in Atomic Scale*, **12**, T. Nishinaga, ed., (Atagawa, Shizuoka Prefec., 1994) pp. 163-167.
16. S.R. Coriell, B.T. Murray, A. A. Chernov, and G.B. McFadden, Interface Morphology during Crystal Growth: Effects of Anisotropic Kinetics and Shear Flow, in *Proc. Third Microgravity Fluid Physics Conference*, CP-3338, (NASA, Wash. D.C., 1996).
17. S.R. Coriell, B.T. Murray, A. A. Chernov, and G.B. McFadden, Interface Morphology during Crystal Growth: Effects of Anisotropy and Fluid Flow, in *Proc. Fourth Microgravity Fluid Physics Conference*, (NASA, Wash. D.C., 1998).
18. A. A. Chernov, P.G. Vekilov, S.R. Coriell, B.T. Murray, and G.B. McFadden, Step Bunching: Influence of Impurities and Solution Flow, in *Proc. First Microgravity Materials Science Conference*, (NASA, Wash. D.C., NASA/CP 1999-209092).
19. S. P. Watson, B.T. Murray, and B. G. Sammakia, Computational Parameter Study of Chip Scale Package Array Cooling, Proceedings of the 2000 ASME-ITHERM Conference, pp.37-43, Las Vegas, NV, May 23-26, 2000.
20. S. J. Meschter, T. J. Singler, L. Yin, and B.T. Murray, The Wetting of Metallic Substrates by Low Melting Point Alloys, in *Interactive Dynamics of Convection and*

Solidification, P. Ehrhard, D.S. Riley and P.H. Steen, eds., (Kluwer, Dordrecht, 2001) pp.195-208.

21. C.S. Hogea, B.T. Murray and J.A. Sethian, Computational Modeling of Solid Tumor Evolution via a General Cartesian Mesh/Level Set Method, Report 05-29, Institute for Computational Engineering and Sciences, The University of Texas at Austin, July 2005.
22. D.A. Davidson, G.L. Lehmann and B.T. Murray, Study of a Gel Thermal Interface Material with Micro-Sized Particles, Proceedings of the 10th ITherm Conference, San Diego, CA, pp. 497-504, 2006.
23. S. Bhopte, B. Sammakia and B.T. Murray, Mixing Enhancement of Two Component Microchannel flow– Geometric and Pulsed Flow Effects, Proceedings of IMECE 2007 (ASME International Mechanical Engineering Congress and Exposition), Seattle, Washington, paper IMECE2007-43387.
24. F. Zhou, P. Arunasalam, B.T. Murray and B. Sammakia, Heat Transport in Thermal Interface Materials Enhanced with MEMS based Microinterconnects, ITherm Proceedings, IEEE, May 2008.
25. S. Bhopte, B. Sammakia and B.T. Murray, Geometric Modification to Simple Microchannel Design for Enhanced Mixing, Proceedings of the Inter-Society Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm), Orlando, Florida, IEEE, May 2008.
26. S. Bhopte, B. Sammakia and B.T. Murray, Application of Two-Way Split Flow Design Techniques to Simple Microchannel Geometries for Enhanced Mixing, Proceedings of the 3rd Frontiers in Biomedical Devices Conference, ASME BioMed2008-38096, Irvine, CA, July 2008.
27. R.T.R. McGrann and B.T. Murray, Improving an ABET Course Assessment Process that Involves Marker Problems and Projects, Proceedings of the ASEE Annual Conference, Austin, Texas, June 2009.
28. M. Ibrahim, S. Gondipalli, S. Bhopte, B. Sammakia, B.T. Murray, K. Ghosh, M. Iyengar and R. Schmidt, Numerical Modeling Approach to Dynamic Data Center Cooling, Proceedings of IEEE ITHERM, Las Vegas, June 2010.
29. M. Ibrahim, S. Bhopte, B. Sammakia, B.T. Murray, M. Iyengar and R. Schmidt, Effect of Thermal Characteristics of Electronic Enclosures on Dynamic Data Center Performance, Proceedings of IMECE 2010 (ASME International Mechanical Engineering Congress and Exposition), Vancouver, British Columbia, paper IMECE2010-40914.
30. Z. Song, B.T. Murray and B. Sammakia, Multi-Variate Prediction of Airflow and Temperature Distributions using Artificial Neural Networks, Proceedings of the ASME InterPACK Conference, IPACK2011-52167, Portland, Oregon, July 2011.
31. M. Ibrahim, F. Afram, B. Sammakia, K. Ghosh, B.T. Murray, M. Iyengar and R. Schmidt, Characterization of a Server Thermal Mass using Experimental Measurements, Proceedings of the ASME InterPACK Conference, IPACK2011-52165, Portland, Oregon, July 2011.

32. M. Ibrahim, B. Sammakia, S. Bhopte, B.T. Murray, M. Iyengar and R. Schmidt, Numerical Study on the Reduction of Recirculation using Sealed Cold Aisles and its Effects on the Efficiency of the Cooling Infrastructure, Proceedings of the ASME InterPACK Conference, IPACK2011-52166, Portland, Oregon, July 2011.
33. X. Xu, B. Sammakia, B.T. Murray, D.-Y. Jung and T. Eilertsen, Thermal Modeling and Heat Management of Supercapacitor Modules by High Velocity Impinging Fan Flow, Proceedings of the IMECE, IMECE2011-65676, Denver, Colorado, November 2011.
34. Z. Song, B.T. Murray, B. Sammakia and S. Lu, Multiobjective Optimization of Temperature Distributions using Artificial Neural Networks, Proceedings of IEEE ITHERM, San Diego, June 2012.
35. X. Xu, M.M. Myers, B. Sammakia and B.T. Murray, Thermal Modeling of Hybrid Concentrating PV/T Collectors with a Tree-Shaped Channel Network Cooling System, Proceedings of IEEE ITHERM, San Diego, June 2012.
36. A-Y. Park, D. Ferrone, S. Cain, D-Y. Jung, B.T. Murray, S.B. Park, K. Hummler, Thermo-Mechanical Simulations of a Copper-to-Copper Direct Bonded 3D TSV Chip Package Interaction Test Vehicle, 63rd IEEE Electronic Components and Technology Conference (ECTC) Proceedings, pp. 2228-2234, 2013.
37. K. Hummler, B. Sapp, J.R. Lloyd, S. Kruger, S. Olson, S.B. Park, B.T. Murray, et al., TSV and Cu-Cu direct bond wafer and package-level reliability, 63rd IEEE Electronic Components and Technology Conference (ECTC) Proceedings, pp. 41-48, 2013.
38. Z. Song, B.T. Murray and B. Sammakia, Prediction of Hot Aisle Partition Airflow Boundary Conditions, Proceedings of InterPACK2013, San Francisco, CA, July 2013.
39. Z. Song, B.T. Murray and B. Sammakia, Improved Zonal Model for Data Center Thermal Analysis, Proceedings of InterPACK2013, San Francisco, CA, July 2013.
40. Z. Song, B.T. Murray and B. Sammakia, Data Center Transient Flow Analysis using Proper Orthogonal Decomposition, Proceedings of IMECE, San Diego, CA, November 2013.
41. K. Nemati, B.T. Murray, B. Sammakia, Experimental Characterization and Modeling of a Water-Cooled Server Cabinet, in the Proceedings of IEEE ITHERM, Orlando, Florida, May 2014.
42. Z. Song, B.T. Murray, B. Sammakia, Parametric Analysis for Thermal Characterization of Leakage Flow in Data Centers, in the Proceedings of IEEE ITHERM, Orlando, Florida, May 2014.
43. S. Alkharabsheh, B. Sammakia, B.T. Murray Experimental Characterization of Pressure Drop in a Server Rack, in the Proceedings of IEEE ITHERM, Orlando, Florida, May 2014.
44. K. Nemati, T. Gao, B.T. Murray and B. Sammakia, Experimental Characterization of the Rear Door Fans and Heat Exchanger of a Fully-Enclosed, Hybrid-Cooled Server Cabinet, in the Proceedings of the 31st IEEE Semiconductor Thermal Measurement and Management Symposium (SEMI-THERM), San Jose, California, March 2015.

45. T. Gao, B. Sammakia, J. Geer, B.T. Murray, R. Tipton and R. Schmidt, Comparative Analysis of Different In-Row Cooler Management Configurations in a Hybrid Cooling Data Center, Proceedings of the ASME InterPACK Conference, San Francisco, California, July 2015, InterPACKICNMM2015-48069.
46. T. Gao, J. Geer, R. Tipton, B.T. Murray, B. Sammakia and R. Schmidt, Raised Floor Hybrid Cooled Data Center: Effect on Rack Inlet Air Temperatures when In-Row Cooling Units are installed between the Racks, Proceedings of the ASME InterPACK Conference, InterPACKICNMM2015-48071, San Francisco, California, July 2015.
47. K. Nemati, H. Alissa, B.T. Murray, B. Sammakia and M. Seymour, Experimentally Validated Numerical Model of a Fully-Enclosed Hybrid Cooled Server Cabinet, Proceedings of the ASME InterPACK Conference, InterPACKICNMM2015-48244, San Francisco, California, July 2015.
48. K. Nemati, H. Alissa, B.T. Murray, and B. Sammakia, Transient and Staedy-State Analysis of a ACU Controlled Data Center, in the Proceedings of the 32nd IEEE Semiconductor Thermal Measurement and Management Symposium (SEMI-THERM), San Jose, California, March 2016.
49. K. Nemati, H. Alissa, T. Wu, M.J. Seymour, B.T. Murray, and B. Sammakia, Cabinet Level Prediction of IT Deployment in Operational Condition Changes, in the Proceedings of the 32nd IEEE Semiconductor Thermal Measurement and Management Symposium (SEMI-THERM), San Jose, California, March 2016.
50. K. Nemati, H. Alissa, B.T. Murray, and B. Sammakia, Experimental Characterization of a Rear Door Heat Exchanger with Localized Containment, in the Proceedings of IEEE ITHERM, Las Vegas, Nevada, June 2016.
51. K. Nemati, H. Alissa, B.T. Murray, and B. Sammakia, Steady-State and Transient Comparison of Cold and Hot Aisle Containment and Chimney, in the Proceedings of IEEE ITHERM, Las Vegas, Nevada, June 2016.
52. A. Azizi, M.A. Daeumer, J.C. Simmons, B. Sammakia, B.T. Murray, Additive Laser Metal Deposition Onto Silicon for Enhanced Microelectronics Cooling, IEEE 69th Electronic Components and Technology Conference (ECTC), 1970-1976, 2019.

Presentations

A) Seminars and Colloquia

1. Double-Diffusive Convection in a Horizontal Layer of Porous Medium, Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, Ind., February 1986.
2. Oscillatory Convection in a Layer of Porous Medium, Department of Mechanical Engineering and Mechanics, Lehigh University, Bethlehem, Penn., March 1986.
3. Numerical Simulation of Oscillatory Channel Flow, Hydrodynamics and Acoustics Branch, U.S. Food and Drug Administration, Rockville, Maryland, June 1987.

4. Double-Diffusive Convection in a Horizontal Layer of Porous Medium, National Institute of Standards and Technology, Gaithersburg, Md., December 1988.
5. Convection Effects in Solidification Problems, Department of Mechanical Engineering Colloquium, Johns Hopkins University, Baltimore, Md., November 1989.
6. Convection Effects in Solidification Problems, Department of Mechanical Engineering Seminar, University of Maryland, February 1990.
7. Applications of Floquet Theory in Hydrodynamics, National Institute of Standards and Technology, Gaithersburg, Md., February 1990.
8. Thermosolutal Convection in a Layer of Porous Medium, Department of Mechanical Engineering, SUNY Stony Brook, N.Y., March 1990.
9. Temporally Modulated Convection in Directional Solidification, Department of Mechanical Engineering Seminar, Howard University, Washington D.C., April 1990.
10. Temporally Modulated Convection in Solidification Problems, Department of Mechanical, Industrial and Nuclear Engineering, University of Cincinnati, Cincinnati, Ohio, May 1990.
11. Temporally Modulated Convection in Directional Solidification, Aachen Center for Solidification in Space, Aachen, W. Germany, July 1990.
12. Effects of Temporal Modulation on Solidification Flows, Mathematics and Computer Science Colloquium, Clarkson University, Potsdamn, N.Y., November 1990, and as a visitor at the IMA, University of Minnesota, Minneapolis, Minn., December 1990.
13. Temporally Modulated Convection in Solidification Problems, Department of Mechanical and Industrial Engineering Seminar, University of Illinois at Urbana-Champaign, April 1991.
14. The Effect of Modulation on Convection, Department of Mechanical and Aerospace Engineering, University of Arizona, Tucson, Arizona, March 1992.
15. Calculation of Solidification Morphologies using a Phase-Field Model, Center for Microgravity and Materials Research, University of Alabama, Huntsville, December 1992.
16. Effects of Modulation on Thermosolutal Convection during Directional Solidification, Department of Chemical Engineering, University of Florida, Gainesville, Florida, October 1993.
17. Calculation of Solidification Morphologies using a Phase-Field Model, Department of Chemical Engineering, Massachusetts Institute of Technology, June 1994.
18. The Effect of Modulation on Convection during Directional Solidification, Department of Chemical Engineering, Cornell University, Ithaca, New York, June 1994.
19. Sharp-Interface versus Phase-Field Methods for Solidification Modeling: Is the Distinction Becoming Diffuse?, Applied and Computational Mathematics Division, NIST, January 1995.
20. Phase-Field Models of Solidification, Dept. of Materials, Ecole Polytechnique Federale, Lausanne, Switzerland, April 1995.

21. Computational Modeling of Heat and Mass Transfer in Solidification Processing, Department of Mechanical, Aerospace and Nuclear Engineering, University of California, Los Angeles, June 1995.
22. Computational Modeling in Materials Processing, Department of Mechanical Engineering, University of South Carolina, Columbia, March 1997.
23. Computational Techniques for Solidification Micro-Modeling, University of Wisconsin, Milwaukee, March, 1997.
24. Computational Modeling of Dendritic Solidification, Washington State University, Pullman, Washington, March 1997.
25. Phase-Field Modeling of Solidification Microstructure, Dept. of Mechanical Engineering, SUNY Binghamton, April 1997.
26. Computational Modeling of Dendritic Solidification, NASA Marshall Space Flight Center, Huntsville, Alabama, May 1997.
27. Spreading and Reactive Wetting of Tin-Based Solders, Department of Mechanical Engineering, Southern Methodist University, Dallas, Texas, March 2001.
28. Computational Modeling of Tumor Growth using the Level-Set Method, Department of Aerospace and Mechanical Engineering, University of Arizona, Tucson, Arizona, November 2004.
29. The Phase-Field Method for Modeling Solidification, Institute for Computational Engineering and Sciences, University of Texas at Austin, Austin, Texas, November 2004.
30. Computational Modeling of Material Microstructure: Applications in Crystal Growth and Tumor Evolution, University of Texas at San Antonio, San Antonio, Texas, March 2005.
31. Simulation of Tumor Growth Behavior using Continuum Based Transport Models, Department of Chemical Engineering, Cornell University, Ithaca, New York, November 2006.
32. Computational Modeling of Multiphase Transport, Watson School Seminar, Binghamton University, Binghamton, New York, March 2008.
33. Computational Modeling of Multiscale, Multiphase Transport, Department of Mechanical and Industrial Engineering, Texas A&M University-Kingsville, Texas, April 2010.
34. Simulation of Tumor Growth Behavior using Continuum Based Transport Models, Department of Bioengineering, SUNY, Binghamton, New York, December 2010.
35. Thermal Modeling of 3D Packaging, Vishwakarma Institute of Technology, Pune, India, January 2013.
36. Energy-Efficiency Improvements for Data Centers, VIT University, Vellore, India, August 2014.
37. The Center for Learning and Teaching at Binghamton University, Vellore, India, August 2014.

38. Thermal Management Applied to Data Centers, SASE Binghamton University, March 2015.
39. In vitro and in silico modeling of EndMT, Division of Applied Mechanics seminar, FDA/CDRH/OSEL, December 2016.
40. Thermal and Chemical Characterization of Aerosols Produced by Electronic Cigarettes, Department of Mechanical Engineering Seminar, Binghamton University, September 2017.
41. Lithium-Ion Battery Thermal Analysis and Management, Binghamton University-Vellore Institute of Technology Webinar Series on Autonomous Systems, March 2021.

B) Invited and Contributed Presentations and Posters

1. Double-Diffusive Instability in a Horizontal Layer of Porous Medium, 37th APS/DFD Meeting, Providence, Rhode Island, November 1984.
2. Variable Property Effects on the Onset of the Double-Diffusive Instability in a Horizontal Layer of Porous Medium, 38th APS/DFD Meeting, Tucson, Arizona, November 1985.
3. Nonlinear Double-Diffusive Convection in a Horizontal Layer of Porous Medium, 10th U.S. National Congress of Applied Mechanics, Austin, Texas, June 1986.
4. Nonlinear Double-Diffusive Convection in a Horizontal Layer of Porous Medium, 39th APS/DFD Meeting, Columbus, Ohio, November 1986.
5. Solutal Convection During Directional Solidification: g-Jitter, Seventh International Conference on Physico-Chemical Hydrodynamics, Cambridge, Massachusetts, June 1989.
6. Temporally Modulated Solutal Convection During Directional Solidification (poster session), Gordon Research Conference on Gravitational Effects in Materials and Processes, Plymouth, New Hampshire, August 1989.
7. The Effect of Gravity Modulation on Thermosolutal Convection During Directional Solidification, 11th U.S. National Congress of Applied Mechanics, Tucson, Arizona, May 1990.
8. The Effect of Gravity Modulation on Thermosolutal Convection During Directional Solidification, 28th COSPAR Meeting, Symposium on Microgravity Research: Material and Fluid Sciences, The Hague, The Netherlands, June 1990.
9. Effects of Temporal Modulation on Solidification, (Invited) Symposium on Interface Instabilities During Solidification, SIAM National Meeting, Chicago, Illinois, July 1990.
10. Stabilization of Taylor-Couette Flow due to Time-Periodic Outer Cylinder Oscillation, 43rd APS/DFD Meeting, Ithaca, New York, November 1990.
11. Oscillatory Convective and Coupled Instabilities during Directional Solidification, 44th APS/DFD Meeting, Phoenix, Arizona, November 1991.

12. The Effect of Gravitational Modulation on Convection in Vertical Bridgman Growth, VIIIth European Symposium on Materials and Fluid Sciences in Microgravity, Brussels, Belgium, April 1992.
13. Gravitational Modulation of Thermosolutal Convection During Directional Solidification, 29th COSPAR Meeting, Symposium on Microgravity Research: Material and Fluid Sciences, Washington, D.C., September 1992.
14. Modulated Thermosolutal Convection during Directional Solidification, 45th APS/DFD Meeting, Tallahassee, Florida, November 1992.
15. Phase-Field Computations for the Solidification of a Pure Material, Poster and video tape presentation at the Gordon Research Conference on Crystal Growth, Oxnard, California, March 1993.
16. Modulated Convection in Directional Solidification, (Invited) April Meeting of the American Physical Society, Washington, D.C., April 1993.
17. Morphological Stability: Interaction of Anisotropic Kinetics and Shear Flows, 9th American Conference on Crystal Growth, Baltimore, Maryland, August 1993.
18. Computation of Complex Solidification Morphologies Using a Phase-Field Model, 29th ASME/AIChE National Heat Transfer Conference, Atlanta, Georgia, August 1993.
19. Convective Instabilities during Directional Solidification: Effect of Gravity Modulation, (Invited) Symposium on "Microgravity Solidification: Theory and Experimental Results", at the TMS/ASM Meeting, Pittsburgh, Penn., October 1993.
20. Modulated Thermosolutal Convection during Directional Solidification, 10th Arizona Fluid Mechanics Conference, Tempe, Arizona, February, 1994.
21. Thermosolutal Convection Subject to High Frequency Vibration during Directional Solidification, Gordon Research Conference on Physicochemical Effects in Microgravity (poster pres.), Henniker, N.H., July 1995.
22. Diffuse Interface Phase-Field Theory of Solidification, (Invited) Symposium on the Thermodynamics and Kinetics of Phase Transformations, Materials Research Society Fall Meeting, Boston, Mass., November 1995.
23. The Phase-Field Equations as a Computational Technique in Crystal Growth (Invited), Tenth American Conference on Crystal Growth, Vail, Colorado, August 1996.
24. Faceted Crystal Growth: Effects of Anisotropic Kinetics and Shear Flow, Gordon Research Conference on Physicochemical Effects in Microgravity (poster pres.), Henniker, N.H., June 1997.
25. The Effect of Anisotropic Kinetics and Imposed Shear Flow on Interfacial Stability during Crystal Growth, 51st APS/DFD Meeting, Philadelphia, Pennsylvania, November 1998.
26. The Effect of Oscillatory Shear Flow on Step Bunching, Gordon Research Conference on Gravitational Effects in Physicochemical Systems, (poster presentation and invited Discussion Leader), Henniker, N.H., June 1999.

27. Modeling the Effects of Kinetic Anisotropy and Oscillatory Shear Flow on Interface Stability, Eleventh American Conference on Crystal Growth, Tucson, Arizona, August 1999.
28. The Effect of Oscillatory Flow in Crystal Growth Models, (Invited) ASM Matericals Conference, Cincinnati, Ohio, October 1999.
29. Modeling Convection during Monotectic Growth, 52nd APS/DFD Meeting, New Orleans, Louisiana, November 1999.
30. Modeling Convection during Monotectic Growth, 37th Annual Technical Meeting, Society of Engineering Science, Columbia, South Carolina, October 2000.
31. Flow Effects during Directional Solidification of Monotectic Alloys, 53nd APS/DFD Meeting, Washington, D.C., November 2000.
32. Modeling Convection during Monotectic Growth, 13th American Conference on Crystal Growth, Burlington, Vermont, August 2001.
33. Reactive Wetting and Spreading in Solder Systems (Invited), 14th National Congress on Theoretical and Applied Mechanics, Blacksburg, Virginia, June 2002.
34. A Simple Level Set Implementation for Computational Modeling of Tumor Growth, SIAM Annual Meeting, Portland, Oregon, July 2004.
35. Computational Techniques for Moving Boundary Problems, (Invited) ERDC Finite Element Workshop, U.S. Army Engineering Research and Development Center, Vicksburg, Mississippi, April 2005.
36. Phase Field Modeling of Solidification Microstructures, (Invited) UNM/LANL Solidification Modeling Workshop, Santa Fe, New Mexico, April 2005.
37. Three-Dimensional, Adaptive Finite Element Simulations of Thermosolutal Convection in Porous Media, (Invited) 8th U.S. National Congress on Computational Mechanics, University of Texas, Austin, Texas, July 2005.
38. Adaptive Finite Element Modeling of Transport in Tumor Evolution, 8th U.S. National Congress on Computational Mechanics, University of Texas, Austin, Texas, July 2005.
39. Improving an ABET Course Assessment Process that Involves Marker Problems and Projects, ASEE Annual Conference, Austin, Texas, June 2009.
40. Modeling Reactive Wetting, (Invited) Society of Industrial and Applied Mathematics Annual Meeting, Denver, Colorado, July 2009.
41. Numerical Study of a Novel Passive Micromixer Design, IEEE ITherm2010 Conference, Las Vegas, Nevada, June 2010.
42. Multiobjective Optimization of Temperature Distributions using Artificial Neural Networks, IEEE ITHERM2012 Conference, San Diego, June 2012.
43. Experimental Characterization of a Fully-Enclosed Water-Cooled Cabinet (Poster), IEEC/GE Electronics Packaging Symposium, Binghamton, New York, October 2013.

44. Numerical Investigation of Inter-Zonal Boundary Conditions for Data Center Thermal Analysis (Poster), IEEC/GE Electronics Packaging Symposium, Binghamton, New York, October 2013.

45. Viscous damping of a periodic perforated microstructure, 66th APS/DFD Meeting, Pittsburgh, PA, November 2013.

46. Mina S, Wang W, Cao Q, Murray B, Huang P, and Mahler GJ. Development of 3D microfluidic device to study endothelial-to-mesenchymal transformation. 39th Annual Northeast Bioengineering Conference (NEBEC), April 2013.

47. Mina, S., Wang W, Cao Q, Murray B, Huang P, Mahler GJ. Development of a microfluidic device to study the role of mechanobiology on endothelial to mesenchymal transformation. (poster) BMES 2014 Annual Meeting, October 2014.

48. Mina, S., Murray B, Huang P, and Mahler GJ. The role of shear stress and matrix composition on endothelial to mesenchymal transformation. (Poster), BMES 2015 Annual Meeting, October 2015.

49. Mina, S., Huang P, Murray BT, Mahler GJ. Flow shear stress regulates mesenchymal transformation induced by transforming growth factor- in human endothelial cells. 42nd Annual Northeast Bioengineering Conference (NEBEC), April 2016.

50. Mina S, Bramsen J, Murray BT, Huang P, Mahler GJ. In vitro and in silico models of endothelial to mesenchymal transformation and tumor-endothelial cell interaction, Biomedical Engineering Society Annual Meeting, October 2017.

51. Mendoza M, Mina S, Huang P, Murray BT, and Mahler GJ. Investigating endothelial to mesenchymal transformation: A Microfluidic model of calcific aortic valve disease (Poster) Biomedical Engineering Society Annual Meeting, October 2018.

52. Chowkwale M, Mahler GJ, Huang P, Murray BT. A multiscale in silico model of endothelial-to-mesenchymal transformation and tumor-endothelial cell interactions (Poster) Biomedical Engineering Society Annual Meeting, October 2018.

53. Mendoza M, Murray BT, Huang P, Mahler GJ, An *In-Vitro* Three-Dimensional Microfluidic Model of the Aortic Valve Fibrosa (Poster), BMES Annual Meeting, October 2019.

54. M. Chowkwale, G. Mahler, P. Huang, B. Murray, A Multi-Scale *In-Silico* Model of Endothelial to Mesenchymal Transformation in a Tumor Microenvironment (Poster), BMES Annual Meeting, October 2019.

55. M Mendoza, MH Chen, B Murray, P Huang, G Mahler, Late-stage Calcific Aortic Valve Disease within an Aortic Valve-on-a-chip Model, Structural Heart 5 (sup1), 69-70, 2021.

56. JA Bramsen, B Alber, B Murray, MH Chen, P Huang, G Mahler, Endothelial to Mesenchymal Transformation-derived Activated Fibroblast Behavior in a 3D Culture Environment, Structural Heart 5 (sup1), 21-21, 2021.

University Service

Chair, Senior IPC Committee, Department of Biomedical Engineering, 2019-20

Lead on the Watson School collaboration with VIT Vellore on Autonomous Vehicles

Member, Middle States Accreditation Working Group VII, 2019-2020

Member, Watson School Ad Hoc Committee on Faculty Development/Assessment, 2015

Member, IPC Committee, Department of Biomedical Engineering, 2015-16, 2021-22

Member, Smart Energy TAE Steering Committee, 2013-2015

Graduate School Outside Examiner, PhD Dissertations, 2002-present

Chair, University Personnel Committee, 2011-2012

Member, University Personnel Committee, 2010-2011

Review Committee for Chancellor's Award for Teaching, 2011

Chair, Watson Undergraduate Studies Committee, 2009-2010

Faculty Senate, Mechanical Engineering Representative, 2001-2003

Member Rosefsky Scholarship Committee, 2002-2003

Department Service

Member, Faculty Search Committee, 2019-2020, 2021-2022

Faculty Adviser, Formula SAE Vehicle, 2018-2019, 2021-2022

Coordinator and author, ABET Self-Study Report, 2017-2018

Chair, Initiating Personnel Committee, 2017-2018

Secretary, Initiating Personnel Committee, 2015-2016

Member, Visiting Faculty Search Committee, 2016

Member, Administrative Assistant Search Committee, 2016

Member, Faculty Search Committee, 2015-2016

Faculty Adviser, SAE Electric Formula Vehicle, 2013-2016

Member, BME Deartment Personnel Committees, 2014-2015

Chair, Faculty Search Committees, 2014-2015

Author, ABET Self-Study Report, 2011-2012

Member, Undergraduate Studies Committee, 2006-present

Chair, Department Webpage Committee, 2011-2013

Chair, Faculty Search Committee, 2010-2011

Faculty Adviser, Pi Tau Sigma Honor Society, 2007-2019

Faculty Adviser, Baja SAE Competition Team, 2007-2012

Chair, Initiating Personnel Committee, 2006-2007

Chair, Faculty Search Committee, 2006-2007

Member, Faculty Search Committee, 2004-2005

Member, Graduate Studies Committee, 2002-2004

Chair, Faculty Search Committee, 2001-2002

Member, Faculty Search Committee, 2000-2001

Graduate Students Completed

Kourosh Nemati, Ph.D. Dissertation Title:"Experimental and Computational Studies on the Role of Confinement Systems in Data Center Thermal Management", December 2016.

Behnam Bozorgmehr, M.S, Thesis Title: "Evaporation of Pure Water and Ethanol-Water Mixture Droplets on Isothermal and Heated Substrates, a Numerical Approach", August 2106.

Bryan Rossi, M.S., Thesis Title: "Modeling of a Thermoelectric Rotating Gas Burner", May 2015.

Zhihang Song, Ph.D. Dissertation Title: "Compact Models for Real-Time Modeling and Control of Data Centers", December 2014. Current Position–Associate Professor, Northeastern University, Shenyang City, Liaoning, China.

Qingfeng Cao, M.S., Thesis Title: "Multi-Scale Mechanobiology Modeling of Cellular Behavior", August 2013.

Daniel Ferrone, M.S., Thesis Title: "Compact Thermal Modeling in 3D Electronics Packaging", May 2013.

Shun Su, Ph.D., Dissertation Title:"The development of computational models for studying wetting, evaporation and thermal transport for small scale systems packaging applications", November 2011. Current Position: Hardware Engineer, Apple, Santa Clara, CA.

Sang Kim, M.S., Thesis Title:"Effectiveness of Specialized Floor Tile Designs on Air Flow Uniformity", May 2011.

Siddharth Bhopte, Ph.D.,Dissertation Title: " Study of Transport Processes from Macroscale to Microscale", August, 2009; Co-Advisor with B. Sammakia. Current Position: Microsoft, Redmond, Washington.

Fan Zhou, M.S., Thesis Title: "Modeling Heat Transport in Thermal Interface Materials Enhanced with MEMS based Microinterconnects", August 2008.

Drew A. Davidson, Department of Mechanical Engineering, SUNY Binghamton, 2006; Co-Advisor with B. Sammakia (Original Advisor-G. L. Lehmann). Current Position–Research Associate, S3IP, SUNY Binghamton.

Cosmina Hogea, Ph.D., Dissertation Title: "Modeling Tumor Growth: A Computational Approach in a Continuum Framework", April, 2005. Current Position–Scientist, GlaxoSmithKline, King of Prussia, Pennsylvania.

Quan Yang, Ph.D., Dissertation Title: "Modeling and Characterization for Small-Scale Packaging Applications", February 2004. Current Position–Aegis Technologies, Santa Ana, California.

Joseph DeAngelo, Ph.D., Dissertation Title: "An Evaluation of Micronized Coal Reburning for Nitrogen Oxide Emissions Reduction in Pulverized Coal-Fired Electric Utility Boilers", May 2001.

Sean Watson, M.S., Thesis Title: "Computational Parameter Study of Chip-Scale Package Array Cooling", August 2000.

Service on Ph.D. Dissertation Committees

A) Active PhD Committees

1. Ayushman Singh, Department of Mechanical Engineering, SUNY Binghamton, current; Advisor: B. Sammakia
2. Javid Azimi Boulali, Department of Mechanical Engineering, SUNY Binghamton, current; Advisor: P. Huang.
3. Jonathan Bramsen, Department of Biomedical Engineering, SUNY Binghamton, current; Advisor G. Mahler.
4. Yoona Salemizadehparizi, Department of Biomedical Engineering, SUNY Binghamton, current; Advisor G. Mahler.

B) Degree Completed

1. Vahideh Radmard, Department of Mechanical Engineering, SUNY Binghamton, 2022; Advisor: B. Sammakia.
2. Cong H Hoang, Department of Mechanical Engineering, SUNY Binghamton, 2022; Advisor: B. Sammakia.
3. Yaman Manaserh, Department of Mechanical Engineering, SUNY Binghamton, 2022; Advisor: B. Sammakia.
4. Melissa Mendoza, Department of Biomedical Engineering, SUNY Binghamton, 2022; Advisor G. Mahler.
5. Yaser Hadad, Department of Mechanical Engineering, SUNY Binghamton, 2019; Advisor: P. Chiarot.
6. Jonathon Hui, Department of Mechanical Engineering, SUNY Binghamton, 2019; Advisor: P. Huang.
7. Mahdi Farahikia, Department of Mechanical Engineering, SUNY Binghamton, 2019; Committee Chair (Advisor: Q. Su)
8. Sadegh Khalili, Department of Mechanical Engineering, SUNY Binghamton, 2019; Advisor: S. Sammakia.
9. Mohammad Tradat, Department of Mechanical Engineering, SUNY Binghamton, 2019; Advisor: B. Sammakia.

10. Ian Claydon, Department of Mechanical Engineering, SUNY Binghamton, 2018; Advisor: B. Sammakia.
11. Mikhail Coloma, Department of Mechanical Engineering, SUNY Binghamton, 2017; Advisors: P. Chiarot and P. Huang.
12. Suraj Maganty, Program in Materials Science and ENgineering, SUNY Binghamton, 2017; Advisor: J. Cho.
13. Wenhui Zhu, Program in Material Science and Engineering, SUNY Binghamton, 2016; Advisor: G. Zhou.
14. Sara Mina, Department of Biomedical Engineering, SUNY Binghamton, 2016; Advisor: G. Mahler.
15. Sudip Dahal, Department of Biomedical Engineering, SUNY Binghamton, 2016; Advisor: G. Mahler.
16. Husam Alissa, Department of Mechanical Engineering, SUNY Binghamton, 2016; Advisor: B. Sammakia.
17. Tianyi Gao, Department of Mechanical Engineering, SUNY Binghamton, 20015; Advisor: B. Sammakia.
18. Cheng Chen, Department of Mechanical Engineering, SUNY Binghamton, 2015; Advisor: B. Sammakia.
19. Liang Li, Program in Material Science and Engineering, SUNY Binghamton, 2015; Advisor: G. Zhou.
20. Sami Alkharabsheh, Department of Mechanical Engineering, SUNY Binghamton, 2014; Advisor: B. Sammakia.
21. Wei Wang, Department of Mechanical Engineering, SUNY Binghamton, 2014; Advisor: P. Huang.
22. Anjali Chauhan, Department of Mechanical Engineering, SUNY Binghamton, 2014; Advisor: B. Sammakia.
23. Xinqiang Xu, Department of Mechanical Engineering, SUNY Binghamton, 2013; Advisor: B. Sammakia.
24. Langli Luo, Department of Mechanical Engineering, SUNY Binghamton, 2012; Advisor: G. Zhou.
25. Subbalakshmi Pisipati, Department of Mechanical Engineering, SUNY Binghamton, 2012; Advisor: B. Sammakia.
26. Abraham Howell, Department of Mechanical Engineering, SUNY Binghamton, 2012; Advisor: R. McGrann.
27. Mahmoud Ibrahim, Department of Mechanical Engineering, SUNY Binghamton, 2012; Advisor: B. Sammakia.
28. Bo Dan, Department of Mechanical Engineering, SUNY Binghamton, 2012; Advisor: B. Sammakia.

29. Harry Schoeller, Department of Mechanical Engineering, SUNY Binghamton, 2011; Advisor: J. Cho.
30. David Rae, Program in Material Science and Engineering, SUNY Binghamton, Expected 2011; Committee Chair; Advisor: E. J. Cotts.
31. Babak Arfaei, Program in Material Science, SUNY Binghamton, 2010; Committee Chair; Advisor: E. J. Cotts.
32. Dylan Farnum, Department of Mechanical Engineering, SUNY Binghamton, 2010; Advisor: B. Sammakia.
33. Travis Fullem, Program in Material Science, SUNY Binghamton, 2008, Committee Chair; Advisor: E. J. Cotts.
34. Saurabh K. Shrivastava, Department of Mechanical Engineering, SUNY Binghamton, 2008; Advisor: B. Sammakia.
35. Anand Desai, Department of Mechanical Engineering, SUNY Binghamton, 2007; Advisor: B. Sammakia.
36. Liang Yin, Department of Mechanical Engineering, SUNY Binghamton, 2005; Advisor: T. J. Singler.
37. Phil Greenfield, Department of Mechanical Engineering, SUNY Binghamton, 2004; Advisor: G. L. Lehmann.
38. Anis Zribi, Department of Mechanical Engineering, SUNY Binghamton, 2002, Committee Chair; Advisor: E. J. Cotts.
39. Hao Tang, Department of Mechanical Engineering, SUNY Binghamton, 2001; Advisor: T. J. Singler.
40. Stephan Meschter, Department of Mechanical Engineering, SUNY Binghamton, 2001; Advisor: T. J. Singler.
41. Shun-Lien Wang, Department of Physics, Carnegie-Mellon University, 1995; Advisor: R. F. Sekerka.
42. Jeffery S. Perkins, Department of Mechanical Engineering and Mechanics, Lehigh University, 1991; Advisor: K. D. Stephanoff.
43. Blaine K. Taylor, Department of Mechanical Engineering and Mechanics, Lehigh University, 1990; Advisor: C. R. Smith.
44. Cheng-Hsiung Kuo, Department of Mechanical Engineering and Mechanics, Lehigh University, 1988; Advisor: D. O. Rockwell.

Current and Former Collaborators

Dr. M.R. Myers, CDRH/OSEL/DAM U.S. Food and Drug Administration, White Oak, Maryland.

Dr. T. Morrison, CDRH/OSEL/DAM U.S. Food and Drug Administration, White Oak, Maryland.

Prof. G. Mahler, Department of Biomedical Engineering, SUNY Binghamton.

Prof. P.H. Huang, Department of Mechanical Engineering, SUNY Binghamton.

Prof. T.J. Singler, Department of Mechanical Engineering, SUNY Binghamton.

Dr. D. Homentcovschi, Department of Mechanical Engineering, SUNY Binghamton and Department of Applied Mathematics University Politehnica of Bucharest, Romania.

Prof. K. Ghose, Department of Computer Science, SUNY Binghamton.

Prof. B. Sammakia, Department of Mechanical Engineering, SUNY Binghamton.

Prof. Y. Joshi, School of Mechanical Engineering, Georgia Institute of Technology.

Prof. A. Ortega, Department of Mechanical Engineering, Villanova University.

Prof. G.F. Carey, Department of Aerospace Engineering and Engineering Mechanics, University of Texas at Austin (Deceased).

Dr. S.R. Coriell, Metallurgy Division, National Institute of Standards and Technology, Gaithersburg, Maryland.

Dr. W.J. Boettinger, Metallurgy Division, National Institute of Standards and Technology, Gaithersburg, Maryland (Retired).

Dr. G.B. McFadden, Mathematical and Computational Sciences Division, National Institute of Standards and Technology, Gaithersburg, Maryland (Retired).

Prof. R.J. Braun, Department of Mathematical Sciences, University of Delaware.

Prof. R.F. Sekerka, Department of Physics, Carnegie-Mellon University (Emeritus).

Dr. A.A. Chernov, Materials Science and Technology Division, Lawrence Livermore National Laboratory.

Prof. C.F. Chen, Department of Aerospace and Mechanical Engineering, University of Arizona (Deceased).

Prof. L.N. Brush, Department of Materials Science, University of Washington.

Prof. D.M. Anderson, Department of Mathematics, George Mason University.

Prof. J.A. Sethian, Department of Mathematics, University of California, Berkeley.