

Dr. Kannan N. Premnath

Department of Mechanical Engineering
University of Colorado Denver
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EDUCATION

- Ph.D. in **Mechanical Engineering** with specialization in **Computational Engineering**
Purdue University, West Lafayette, U.S.A. 2001 – 2004
- M.S. in **Mechanical Engineering**
Purdue University, West Lafayette, U.S.A. 1999 – 2001
- B.E. in **Mechanical Engineering** with **Summa cum Laude (University Gold Medal)**
College of Engineering, Guindy, Anna University, Chennai, India 1993 – 1997

SELECTED HONORS AND AWARDS

- Lynn Fellow**, Interdisciplinary Award for Outstanding Doctoral Students,
Computing Research Institute, Purdue University, U.S.A. 2001 – 2002
- University Gold Medal**, First Rank among all students in Mechanical Engineering,
Anna University, India 1993 – 1997
- Cartwright Memorial Endowment Prize**, First Rank in Mechanical Engineering,
Anna University, India 1993 – 1997
- Ramanujan Centenary Gold Medal**, Overall Best Performance in all Mathematics exams
among all students, Anna University, India 1993 – 1995
- First Indian Principal, College of Engg., Nagaratnam Memorial Endowment Prize**,
Highest Grades among Civil, Mechanical and Electrical Engg. students,
in 1st to 7th Semesters, Anna University, India 1993 – 1997
- Guindy Engineers 1962 Trust Endowment Prize**, Best Academic Performance,
Co-curricular and Extra-curricular activities, Anna University, India 1993 – 1997

RESEARCH & TEACHING INTERESTS

- Computational Fluid Dynamics (CFD) and Heat Transfer
- Fluid Mechanics (Turbulence, Multiphase Flows, Reacting Flows)
- Heat/Mass Transport Phenomena
- Lattice Boltzmann Methods
- Advanced Numerical Methods
- High Performance/Parallel Computing
- Internal Combustion Engine Sprays & Combustion
- Applications related to Energy & Transportation Systems

EXTERNAL RESEARCH GRANTS/CONTRACTS FUNDING HISTORY

Total extramural funding over **\$850,000** secured in *about 3 years* as the Principal Investigator (PI) and supercomputing times from leading HPC centers

- “Development of Three-dimensional Cascaded Lattice Boltzmann Method for Computation of Turbulent Flows” awarded by *NCSA/NSF Teragrid* (Grant No. CTS110023) in Dec. 2010 for 1 year (*Principal Investigator*)
[Link: https://www.teragrid.org/web/user-support/alloc_query]
- “A Novel Lattice Boltzmann Method for Immiscible Multiphase Flows with High Viscosity Contrasts and Wetting Effects” funded by *Ingrain Inc., Houston, TX* in Sept. 2008. Award amount: **\$100,000** for 5 months (*Principal Investigator*)
- “Large Eddy Simulations of Wall-Bounded Turbulent Flows using the Generalized Lattice Boltzmann Equation” awarded by *NCSA/NSF Teragrid* (Grant No. CTS060027) in Mar. 2007 for 1 year (*Principal Investigator*)
- “Computational Aeroacoustics using the Generalized Lattice Boltzmann Equation”, a Phase II SBIR project funded by *NASA* (Contract No. NNL07AA04C) in Nov. 2006. Award amount: **\$600,000** for 2 years (*Principal Investigator*)
[Links: <http://sbir.gsfc.nasa.gov/SBIR/sbir2005/phase2/awards/2005press.html> for NASA Press Release, and <http://sbir.gsfc.nasa.gov/SBIR/abstracts/05/sbir/phase2/SBIR-05-2-A2.04-8523.html> for project abstract] (Program Monitor: Dr. R. Rubinstein, NASA Langley)
- “Lattice Boltzmann Method for Multiphase Reacting Flows with Chemical Industry Applications”, a Phase I SBIR project funded by *NSF* (Grant No. OII-0610893) in May 2006. Award amount: **\$100,000** for 6 months (*Principal Investigator*) (Program Manager: Dr. R. Wesson, NSF)
[Link: <http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0610893>]
- “Computational Aeroacoustics using the Generalized Lattice Boltzmann Equation”, a Phase I SBIR project funded by *NASA* (Contract No. NNL06AA34P) in Jan. 2006. Award amount: **\$70,000** for 6 months (*Principal Investigator*) (Technical Monitor: Dr. F. Farassat, NASA Langley)
[Link: http://sbir.nasa.gov/SBIR/abstracts/05/sbir/phase1/SBIR-05-1-A2.04-8523.html?solicitationId=SBIR_05_P1]

- “Lattice Boltzmann Simulations of Magnetohydrodynamic Flows in Fusion Applications” awarded by *NCSA* (Grant No. CTS060027) in Jan. 2006 for 1 year (*Principal Investigator*)
- “Development of a Prototype Lattice Boltzmann Code for CFD of Fusion Systems”, a Phase II SBIR project supported by DOE (Grant No. DE-FG02-03ER83715). Award amount: **\$750,000** for 2 years (*Co-Investigator*) (Program Manager: Dr. G. Nardella, DOE)
[Link: <http://www.sbir.gov/sbirsearch/detail/231146>]

PROFESSIONAL EXPERIENCE

Assistant Professor, Department of Mechanical Engineering, University of Colorado Denver,
Denver, CO, U.S.A. Aug. 2012 – till date

- **Research:**
 - Developing new lattice Boltzmann methods and computational fluid dynamics (CFD) approaches with applications related to fundamental problems in fluid mechanics and thermal sciences
- **Teaching:**
 - Macroscopic Thermodynamics – ME5122, Graduate (Fall 2012)
 - Numerical Methods in Engineering – ME3010, Undergraduate (Spring 2013)
 - Heat Transfer – ME 5162, Graduate (Fall 2013)
- Mentored/advised graduate students
- Wrote grant proposals for research funding
- Published papers on new developments in CFD in journals and presentations in national/international conferences
- Invited to serve as a reviewer for research articles submitted for publication in various leading journals

Assistant Professor, Department of Mechanical Engineering, University of Wyoming,
Laramie, WY, U.S.A.. (Visiting) Aug. 2009 – Aug. 2011
(Adjunct) Sept. 2011 – Aug. 2012

- **Research:**
 - New Computational Fluid Dynamics (CFD) methods and code development for turbulence simulations
 - Fundamental investigations in fluid dynamics and transport phenomena involving phase transitions related to materials processing applications
- **Teaching:**
 - Fluid Dynamics – ES2330, Undergraduate (Fall 2009, Spring 2010)
 - Advanced Fluid Mechanics – ME5442, Graduate (Spring 2010)
 - Thermo-fluids Laboratory – ME 2160, Undergraduate (Fall 2010, Spring 2011)
 - Turbulence – ME 5442, Graduate (Spring 2011)
- Mentored/advised graduate students (Thesis Research)
- Wrote grant/contract proposals for research funding
- Published papers on new developments in CFD in journals and presentations in national/international conferences
- Invited to serve as a reviewer for research articles submitted for publication in various leading journals
- Received excellent teaching evaluations from students

Visiting Researcher, The CUNY Energy Institute, CCNY, City University of New York, NY, U.S.A.
Apr. 2009 – Aug. 2009

- Developed novel methods based on phase field models for large scale simulations of complex fluid/solid structures (dendritic structures) in electro-chemical applications related to energy storage in novel batteries
- Developed convergence acceleration techniques for flow solvers for efficient simulations
- Collaborated with researchers at the Energy Institute on the development and analysis of fluid engineering issues related to energy systems

Senior Engineer/Principal Investigator, MetaHeuristics LLC, Santa Barbara, CA, U.S.A.

Nov. 2004 – Apr. 2009

- Principal Developer of a Computational Fluid Dynamics (CFD) code (MetaCFD) based on cutting-edge formulations/algorithms based on lattice Boltzmann methods. MetaCFD handles single-phase, multi-phase and complex fluid flows with heat transport, including state-of-the art turbulence modeling capabilities in complex geometries on large parallel clusters
- Lead and coordinated with a team of professionals (engineers, software developers) to conduct research & develop methods and codes for fluids engineering applications
- Conducted Engineering Analysis of Fluids Engineering/Heat Transfer Systems in complex geometries (thermo-fluid transport in internal systems, external turbulent flows and aero-acoustics in aerospace applications, multiphase flows in oil & gas applications, magnetically confined liquid metal flows in fusion systems)
- Wrote contract/grant proposals as the Principal Investigator (PI) and successfully secured funded research & development SBIR projects from various federal agencies (such as NASA, National Science Foundation, Department of Energy, NCSA/Teragrid) and private industrial organizations (such as Ingrain Inc., Houston, TX) – secured external research & development funds of over **\$850,000** during a period of about *three* years while serving as the PI (see www.kannanpremnath.com for details)
- Presented project deliverables to federal and industrial organization that awarded contracts – For example, NASA SBIR Phase II project deliverables rated as “Excellent”
- Published papers on new computational methods and fluids/thermal physics investigations in various leading journals and national/international conferences.
- Participated in NSF SBIR Grantees Workshop involving various topics on Innovation, Entrepreneurship and Intellectual Property (IP) Protection conducted by NSF and MIT Enterprise Forum.

Visiting Researcher, University of California Santa Barbara (UCSB), Santa Barbara, CA, U.S.A.

Nov. 2004 – Feb. 2008

Advisor: Prof. (Emeritus) Sanjoy Banerjee

- Developed lattice Boltzmann methods for turbulent flows and multiphase systems; subgrid scale modeling for large eddy simulation; novel approaches for free-surface and interfacial flow problems
- Collaborated with researchers at UCSB on computational methods

Research & Teaching Assistant, School of Mechanical Engineering, Purdue University, IN, U.S.A.

Aug. 1999 – Oct. 2004

Advisor: Prof. John Abraham

- Developed new lattice Boltzmann models and computational methods for understanding the physics of multiphase flows involving drops and their interactions

- Developed parallel algorithms for a three-dimensional (3D) block structured legacy code (REC-2000) based on finite volume methods that computes two-phase, turbulent, reacting, in cylinder flows in reciprocating and rotary engines using curvilinear coordinates
- Investigated the physics of drop dynamics and turbulent mixing in early-injection Diesel engines
- Assisted major professor in the preparation of research proposals and reviewed journal articles
- Served as instructor for Internal Combustion Engines (ICE) lab course and grader for ICE theory course

R&D Engineer, Larsen & Toubro Limited, Mumbai, India

July 1997 – July 1999

- Performed research & development in the analysis and design of engineering projects – validated new designs of complex engineering systems related to power generation systems such as heat exchangers and pressure vessels
- Improved design methodology of thermo-fluid systems and contributed towards process improvement
- Developed new in-house computer codes for engineering analysis/design and reduced turnaround times of simulations
- Contributed towards writing technical proposals by the Strategic Business Units (SBUs) to secure new contracts for the design and construction of thermo-fluid systems

PUBLICATIONS

BOOK CHAPTER

Kannan N. Premnath and John Abraham, "Lattice Boltzmann Method for Sprays", *Handbook of Atomization and Sprays, Theory and Applications* (Edited by N. Ashgriz), ISBN: 978-1441972637, Springer (2011).

JOURNALS

Dhiraj Patil, Kannan N. Premnath, Divyaraj Desai** and Sanjoy Banerjee, "Electrodeposition Modeling using Coupled Phase-Field and Lattice Boltzmann Approach", *International Journal of Modern Physics C*, in press.

Kannan N. Premnath, Martin Pattison and Sanjoy Banerjee, "Computation of transitional flow past a circular cylinder using multiblock lattice Boltzmann method with a dynamic subgrid scale model", *Fluid Dynamics Research*, **45**, 055510 (2013).

Kannan N. Premnath, Martin Pattison and Sanjoy Banerjee, "An Investigation of the Lattice Boltzmann Method for Large Eddy Simulation of Complex Turbulent Separated Flow", *Journal of Fluids Engineering - Transactions of the ASME*, **135**, 051401 (2013).

Kannan N. Premnath and Sanjoy Banerjee, "Inertial Frame Independent Forcing for Discrete Velocity Boltzmann Equation: Implications for Filtered Turbulence Simulation", *Communications in Computational Physics*, **12**, 732 (2012).

Ming Liu**, Xiao-Peng Chen and Kannan N. Premnath, "Comparative Study of the Large Eddy Simulations with the Lattice Boltzmann Method using the Wall-Adapting Local Eddy-Viscosity and Vreman Subgrid Scale Models", *Chinese Physics Letters*, **29**, 104706 (2012).

- Kunal Soni** and Kannan N. Premnath, "Effect of Magnetic Field on the Natural Convection from a Vertical Melting Substrate", *International Journal of Thermal Science*, **53**, 89 (2012).
- Kannan N. Premnath and Sanjoy Banerjee, "On the Three-Dimensional Central Moment Lattice Boltzmann Method", *Journal of Statistical Physics*, **143**, 747 (2011).
- Nicholas K. Burgess** and Kannan N. Premnath, "Interaction of Kelvin Force and Transport across a Melting Substrate in a Microgravity Environment", *Physical Review E*, **82**, 046303 (2010).
- Kannan N. Premnath and Sanjoy Banerjee, "Incorporating Forcing Term in Cascaded-Lattice Boltzmann Approach by Method of Central Moments", *Physical Review E*, **80**, 036702 (2009).
- Kannan N. Premnath, Martin J. Pattison and Sanjoy Banerjee, "Dynamic Subgrid Scale Modeling of Turbulent Flows using Lattice-Boltzmann Method", *Physica A*, **388**, 2640 (2009).
- Kannan N. Premnath, Martin J. Pattison and Sanjoy Banerjee, "Generalized Lattice Boltzmann Equation with Forcing Term for Computation of Wall-Bounded Turbulent Flows", *Physical Review E*, **79**, 033902 (2009).
- Martin J. Pattison, Kannan N. Premnath and Sanjoy Banerjee, "Computation of Turbulent Flow and Secondary Motions in a Square Duct using a Forced Generalized Lattice Boltzmann Equation", *Physical Review E*, **79**, 034902 (2009).
- Kannan N. Premnath, Martin J. Pattison and Sanjoy Banerjee, "Large Eddy Simulation of Self-Sustained Flow Instabilities in Cavities using the Lattice-Boltzmann Method", *AIAA Journal*, **47**: 1-21 (2009).
- Kannan N. Premnath and Martin J. Pattison, "Steady State Convergence Acceleration of the Generalized Lattice Boltzmann Equation with Forcing Term through Preconditioning", *Journal of Computational Physics*, **228**, 746-769 (2009).
- Martin J. Pattison, Kannan N. Premnath, Neil B. Morley and Mohamed A. Abdou, "Progress in Lattice Boltzmann Methods for Magnetohydrodynamic Flows Relevant to Fusion Applications", *Fusion Engineering & Design*, **83**, 557-572 (2008).
- Kannan N. Premnath and John Abraham, "Three-dimensional Multi-Relaxation-Time (MRT) Lattice Boltzmann Models for Multiphase Flows", *Journal of Computational Physics*, **224**, 539-559 (2007).
- Martin J. Pattison, Kannan N. Premnath and Neil B. Morley, "Lattice Boltzmann Methods for Magnetohydrodynamic Flows in Fusion Applications", *Fusion Science and Technology*, **52**, 812-816 (2007).
- Kannan N. Premnath and John Abraham, "Lattice Boltzmann Model for Axisymmetric Multiphase Flows", *Physical Review E* **71**, 056706 (2005).
- Kannan N. Premnath and John Abraham, "Simulations of Binary Drop Collisions with a Multiple Relaxation Time (MRT) Lattice Boltzmann Model", *Physics of Fluids* **17**, 122105 (2005).

Kannan N. Premnath and John Abraham, "Lattice Boltzmann Simulations of Drop-Drop Interactions in Two-Phase Flows", *International Journal of Modern Physics C* **16**, 1-20 (2005).

Kannan N. Premnath, Michael E. McCracken and John Abraham, "A Review of Lattice Boltzmann Methods for Multiphase Flows Relevant to Engine Sprays", *Transactions of the Society of Automotive Engineers: Journal of Engines* **113**, 929-940 (2005).

Kannan N. Premnath and John Abraham, "Discrete Lattice BGK Boltzmann Equation Computations of Transient Incompressible Turbulent Jets", *International Journal of Modern Physics C* **15**, 699-719 (2004).

Seeniraj, R.V. and Kannan N.P., "Magnetic Field Effects upon Heat Transfer for Laminar Flow of Warm Liquid over a Melting Slab", *International Journal of Heat and Mass Transfer* **46**, 1599-1605 (2003).

Seeniraj, R.V., Velraj, R. and Kannan N.P., "Analytical Solutions for Planar and Axisymmetric Melting with Heat Capacity Effects of Flowing Stream and PCM", *International Communications in Heat and Mass Transfer* **25**, 1041-1058 (1998).

(Note: ** denotes student author)

PAPERS UNDER REVIEW

Kannan N. Premnath and Yang Ning**, "Axisymmetric Cascaded Lattice Boltzmann Method"

Yang Ning** and Kannan N. Premnath, "Numerical Study of the Properties of the Central Moment Lattice Boltzmann Method"

Dhiraj Patil, Kannan N. Premnath and Sanjoy Banerjee, "Multigrid Lattice Boltzmann Method for Accelerated Solution of Elliptic Equations"

Kannan N. Premnath, "Viscous Current induced by Kelvin Force in Ordinary Fluids with Susceptibility Contrasts"

PAPERS IN PREPARATION

Kannan N. Premnath, Dhiraj Patil and Sanjoy Banerjee, "Preconditioned Multiple Relaxation Time Lattice Boltzmann Method for Steady Multiphase Flows with Wetting", in preparation.

Zachary Ingalls** and Kannan N. Premnath, "A Computational Study of Heat Sink Designs in a Direct Burial LED Light Fixture: Effects on Junction Temperature", in preparation.

Kannan N. Premnath and Suleiman Abdelrahim**, "Thermocapillary Convection in the presence of Kelvin Force", in preparation.

Kannan N. Premnath and Jumaa Dawoud, "Effect of Magnetic Field on Unsteady Sliding Contact Melting Process of Electrically Conducting Solids", in preparation.

Kannan N. Premnath, “Effects of Streamwise Rotation on Bounded Turbulence using the Lattice Boltzmann Method”, in preparation.

Kannan N. Premnath, “Cascaded Lattice Boltzmann Method for Multiphase Flows”, in preparation.

Kannan N. Premnath, “On the Curved Boundary Conditions based on the Generalized Local Non-Equilibrium Extrapolation”, in preparation.

CONFERENCE PROCEEDINGS - REFEREED PAPERS

Kannan N. Premnath, Dhiraj Patil and Sanjoy Banerjee, “Application of Coupled Lattice Boltzmann and Phase-Field Methods for Multiphase Flow Simulations”, Paper HT2013-17696, *Proceedings of the ASME 2013 Summer Heat Transfer Conference*, Minneapolis, MN, U.S.A., July 2013.

Sanjoy Banerjee, Kannan N. Premnath and Martin J. Pattison, “Turbulence Simulation using the Generalized Lattice Boltzmann Equation on Massively Parallel Architectures”, *3rd Asian-Pacific Conference on Computational Mechanics (APCOM '07)* in conjunction with *11th International Conference on Enhancement and Promotion of Computational Methods in Engineering and Science (EPMESC XI)*, Kyoto, Japan, Dec. 2007. (**Invited Paper**)

Martin J. Pattison, Kannan N. Premnath and Sanjoy Banerjee, “Turbulence-Induced Secondary Flows in a Square Duct using a Multiple-Relaxation-Time Lattice Boltzmann Approach”, *5th International Symposium on Turbulence and Shear Flow Phenomena (TSFP-5) Conference*, Munich, Germany, Aug. 2007.

Kannan N. Premnath, Jean-Christophe Nave and Sanjoy Banerjee, “Computations of Multiphase Flows with Lattice Boltzmann Methods”, Symposium on Gas-Liquid and Phase-Change at Macro- and Micro-Scales, *American Society of Mechanical Engineers (ASME) International Mechanical Engineering Congress and Exposition (IMECE) 2005*, Orlando, Florida, Nov. 2005. (**Invited Paper**)

Kannan N. Premnath and John Abraham, “Simulations of Drop-Drop Collisions with a Lattice Boltzmann Model”, *18th Annual Conference on Liquid Atomization and Spray Systems – ILASS Americas 2005*, Irvine, California, May 2005.

Kannan N. Premnath, Michael E. McCracken and John Abraham, “A Review of Lattice Boltzmann Methods for Multiphase Flows Relevant to Engine Sprays”, SAE Paper 2005-01-0996, Session on Fundamental Advances in Thermal and Fluid Sciences. *Society of Automotive Engineers (SAE) 2005 World Congress*, Detroit, Michigan, Apr. 2005. (**Invited Paper**)

Kannan N. Premnath and John Abraham, “Lattice Boltzmann Simulations of Drop-Drop Investigations in Two-Phase Flows”, *5th International Conference on Multiphase Flow*, Yokohama, Japan, June 2004.

Kannan N. Premnath, Shiladitya Mukherjee and John Abraham, “Lattice Boltzmann Simulations of a Wall Impinging Drop”, *17th Annual Conference on Liquid Atomization and Spray Systems – ILASS Americas 2004*, Washington D.C., May 2004.

Kannan N. Premnath, Michael McCracken, Vinicio Magi and John Abraham, "Lattice Boltzmann Studies of Droplet Deformation", *16th Annual Conference on Liquid Atomization and Spray Systems – ILASS Americas 2003*, Monterey, California, May 2003.

Kannan N. Premnath and John Abraham, "Lattice Boltzmann Simulations of Flows in a Duct with Multiple Inlets", SAE Paper 2003-01-0220. *Society of Automotive Engineers (SAE) 2003 World Congress*, Detroit, Michigan, March 2003.

Kannan N. Premnath and John Abraham, "Lattice Boltzmann Simulations of Incompressible Jets on Parallel Computers", HPC Paper 0144. *High Performance Computing (HPC) Symposium, Advanced Simulation Technologies Conference (ASTC) 2002*, San Diego, California, Apr. 2002.

Kannan N. Premnath, Vinicio Magi and John Abraham, "Parallelization of a Multidimensional Code for the Simulation of Flows in Engines: Performance with OpenMP Programming Model", HPC Paper 0148. *High Performance Computing (HPC) Symposium Advanced Simulation Technologies Conference (ASTC) 2002*, San Diego, California, Apr. 2002.

Kannan N. Premnath and John Abraham, "Dependence of Fuel-Air Mixing Characteristics on Injection Timing in an Early-Injection Diesel Engine", SAE Paper 2002-01-0994. *Society of Automotive Engineers (SAE) 2002 World Congress*, Detroit, Michigan, March 2002.

CONFERENCE PRESENTATIONS - REFEREED ABSTRACTS

Dhiraj Patil, Kannan N. Premnath, Divyaraj Desai and Sanjoy Banerjee, "Electrodeposition Modeling using Coupled Phase-field and Lattice Boltzmann Approach", 21st Discrete Simulation of Fluid Dynamics (DSFD 2012), Bangalore, India, Aug. 2012.

Kannan N. Premnath, Yang Ning and Nima Fathi, "Moment Relaxation Formulations of the Lattice Boltzmann Method and Their Applications", 19th Discrete Simulation of Fluid Dynamics (DSFD 2010), Rome, Italy, July 2010.

Kannan N. Premnath, Martin J. Pattison and Sanjoy Banerjee, "Lattice Boltzmann Method based on Phase-Field Models for Multiphase Flows including Phase Change", *American Institute of Chemical Engineers (AIChE) 2006 Annual Meeting*, San Francisco, California, Nov. 2006.

Martin J. Pattison, Kannan N. Premnath and Neil B. Morley, "Lattice Boltzmann Methods for Magnetohydrodynamic Flows in Fusion Applications", *American Nuclear Society (ANS) Winter Meeting*, Albuquerque, New Mexico, Nov. 2006.

Kannan N. Premnath and Martin J. Pattison, "Computation of Magnetohydrodynamic Flows using the Lattice Boltzmann Method", *Plasma Facing Components Meeting*, Princeton Plasma Physics Lab (PPPL), Princeton, New Jersey, May 2005.

Kannan N. Premnath and John Abraham, "A Lattice Boltzmann Scheme for Axisymmetric Multiphase Flows", *1st International Conference on Mesoscopic Methods in Engineering and Science*, Braunschweig, Germany, July 2004.

THESIS/DISSERTATIONS

Kannan N. Premnath, “Lattice Boltzmann Models for Simulations of Drop-Drop Collisions”, Ph.D. Dissertation, Oct. 2004, Purdue University, West Lafayette, IN, U.S.A.

Kannan N. Premnath, “An Approach to Parallelizing a Multidimensional Code for Engines with Applications to Early-Injection Engines”, M.S. Thesis, May 2001, Purdue University, West Lafayette, IN, U.S.A.

Kannan N. Premnath, “An Analytical and Experimental Study of the Shell and Tube Latent Heat Thermal Storage Device”, B.E. Thesis, May 1997, Anna University, Chennai, India.

TECHNICAL REPORTS

Kannan N. Premnath, “Computational Aeroacoustics using the Generalized Lattice Boltzmann Equation”, MetaHeuristics LLC, Santa Barbara, CA, Nov. 2008, Phase II NASA SBIR Final Report of Contract NNL06AA34P submitted to NASA Langley Research Center, Hampton, VA (Technical Monitor: Dr. R. Rubinstein, NASA Langley).

Martin J. Pattison, Kannan N. Premnath, Vinay Dwivedi and Sanjoy Banerjee, “Development of a Prototype Lattice Boltzmann Code for CFD of Fusion Systems”, MetaHeuristics LLC, Santa Barbara, CA, Jan. 2007, Phase II DOE SBIR Final Report of Award OII-0610893 submitted to DOE, Washington D.C. (Program Manager: Dr. G. Nardella, DOE).

Kannan N. Premnath, “Lattice Boltzmann Method for Multiphase Reacting Flows with Chemical Industry Applications”, MetaHeuristics LLC, Santa Barbara, CA, Jan. 2007, Phase I NSF SBIR Final Report of Award OII-0610893 submitted to NSF, Washington D.C. (Program Manager: Dr. R. Wesson, NSF).

Kannan N. Premnath, “Computational Aeroacoustics using the Generalized Lattice Boltzmann Equation”, MetaHeuristics LLC, Santa Barbara, CA, July 2006, Phase I NASA SBIR Final Report of Contract NNL06AA34P submitted to NASA Langley Research Center, Hampton, VA (Technical Monitor: Dr. F. Farassat, NASA Langley).

Kannan N. Premnath, “Double Wall Liquefied Gas Storage Tank (DWST620) Program User Manual”, Tech. Report. No. **7224**, R&D – Group II, Larsen & Toubro Limited, Bombay, India, Aug. 1998.

Kannan N. Premnath, “Mechanical Design Aspects of Double-Wall Liquefied Gas Storage Tank”, Tech. Report. No. **7193**, R&D – Group II, Larsen & Toubro Limited, Bombay, India, Nov. 1997.

PROFESSIONAL SOCIETIES AND SERVICE

- American Society of Mechanical Engineers (ASME) Member
- Reviewer for Journal of Computational Physics, 2006-
- Reviewer for Physical Review E, 2009-
- Reviewer for Physical Review Letters, 2011-
- Reviewer for Physica A: Statistical Mechanics and Applications, 2007-

- Reviewer for Applied Mathematics and Computation, 2009-
- Reviewer for Journal of Computers and Mathematics with Applications, 2009-
- Reviewer for Journal of Computational and Applied Mathematics, 2008-
- Reviewer for Applied Mathematical Modelling, 2011-
- Reviewer for Computer Methods in Applied Mechanics and Engineering, 2013-
- Reviewer for Journal of Sound and Vibration, 2011-
- Reviewer for Journal of Porous Media, 2010-
- Reviewer for Physics Letters A, 2011-
- Reviewer for Journal of Physics A: Mathematical and General, 2004-
- Reviewer for International Journal of Heat and Fluid Flow, 2011-
- Reviewer for ASME Journal of Fluids Engineering, 2011-
- Reviewer for AIAA Journal of Propulsion and Power, 2013-
- Reviewer for Fluid Dynamics Research, 2013-
- Reviewer for International Journal of Heat and Mass Transfer, 2013-
- Reviewer for Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science, 2011-
- Reviewer for Atmospheric Environment, 2012-
- Reviewer for Engineering Applications for Computational Fluid Mechanics, 2013-
- Reviewer for Journal of Simulation Modelling Practice and Theory, 2007-

- Reviewer for ASME Summer Heat Transfer Conference, 2012
- Reviewer for 5th International Symposium on Turbulence and Shear Flow Phenomena (TSFP-05), 2006
- Reviewer for 11th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-11), 2005
- Reviewer for Society of Automotive Engineers (SAE) World Congress, 2003

GRADUATE THESIS COMMITTEES

University of Colorado Denver

- Zachary Ingalls, “A Computational Study of Heat Sink Designs in a Direct Burial LED Light Fixture: Effects on Junction Temperature”, M.S. Project (2013) – Major Advisor

- Suleiman Abdelrahim, “Thermocapillary Convection in the Presence of Kelvin Force”, M.S. Project (2013) – Major Advisor

- Jumaa Dawoud, “Effect of Magnetic Field on Unsteady Sliding Contact Melting Process of Electrically Conducting Solids”, M.S. Project (2013) – Major Advisor

University of Wyoming

- Yang Ning, “Numerical Investigation of the Cascaded Lattice Boltzmann Method”, M.S. Thesis (2011) – Major Advisor

- Kunal Soni, “Development of an Overset Grid Computational Fluid Dynamics Solver on Graphical Processing Units”, M.S. Thesis (2011)

RECENT SEMINARS & TALKS

- *Generalized Lattice Boltzmann Methods and Its Variants for Fluid Flows: Concepts and Applications*, Department of Mechanical Engineering Seminar, **University of Colorado Denver**, Denver, CO, April 23, 2012.
- *Generalized Lattice Boltzmann Method and Its Variants for Fluid Flows: Concepts and Applications*, Mechanical Engineering Department Seminar, **Louisiana State University**, Baton Rouge, LA, March 30, 2009.
- *Generalized Lattice Boltzmann Methods and Its Variants for Fluid Flows: Concepts and Applications*, Mechanical Engineering Department Seminar, **University of Wyoming**, Laramie, WY, March 23, 2009.
- *On Lattice-Boltzmann Methods for Complex Fluid Flow and Transport Phenomena*, Mechanical Engineering Seminar, **University of Victoria**, British Columbia, Canada, April 29, 2008
- *Lattice-Boltzmann Methods for Fluid Flow and Transport Phenomena*, Mechanical and Industrial Engineering Seminar, **Northeastern University**, Boston, MA, April 23, 2008
- *Lattice Boltzmann Methods and Beyond*, Mechanical Engineering Department Seminar, **University of California, Santa Barbara (UCSB)**, Santa Barbara, CA, April 9, 2008.
- *Recent Developments in Lattice Boltzmann Methods for Computational Fluid Dynamics*, Aerospace and Mechanical Engineering Seminar, **Boston University**, Boston, MA, March 20, 2008.
- *Lattice-Boltzmann Method: Recent Developments for Simulations of Turbulent Flows, Multiphase Systems and Magnetohydrodynamics*, Mechanical and Aerospace Engineering Thermo/Fluids Seminar Series, **University of California, Los Angeles (UCLA)**, Los Angeles, CA, February 1, 2008.
- *Lattice Boltzmann Simulations of Fluid Flows in Exhaust Manifolds of Engines*, Combustion, Energy Utilization and Thermodynamics Seminar Series, School of Mechanical Engineering, **Purdue University**, IN, Oct. 2002.
- *Lattice Boltzmann Simulations of Flows in Jets and Channels*, Computational Science and Engineering Program Spring 2002 Seminar Series, Department of Computer Sciences, **Purdue University**, IN, Mar. 2002.
- *Mixing Characteristics in PREDIC Engines*, Combustion, Energy Utilization and Thermodynamics Seminar Series, School of Mechanical Engineering, **Purdue University**, IN, Nov. 2001.
- *Serial and Parallel Multidimensional Computations of Diesel Engine Flows*, Computational Science and Engineering Program Fall 2000 Seminar Series, Department of Computer Sciences, **Purdue University**, IN, Nov. 2000.

In addition, I have made presentations to personnel of various U.S. industrial/corporate organizations including *Fluent Inc.*, *Ingrain Inc.*, *Detroit Diesel Corporation*, *John Deere Corporation*, *Cummins Engine Company*, *Arvin Meritor* and *General Atomics-Aeronautical*.

GRADUATE COURSE WORK

- Numerical Methods in Heat, Mass and Momentum Transfer
- Parallel Computing
- Introduction to Computational Science
- Intermediate Fluid Mechanics
- Boundary Layer Theory
- Principles of Turbulence

- Turbulence and Turbulence Modeling
- Heat and Mass Transfer
- Combustion
- Internal Combustion Engines
- Statistical Thermodynamics
- Statistical Mechanics