

# EXTENDED CURRICULUM VITA

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## Formal Education:

- Post-doctoral fellow with Professor S. G. Advani at the Center for Composite Materials, University of Delaware and W.L. Gore & Associates from 1998 to 1999
- Post-doctoral fellow with Professor C. L. Tucker III and Dr. F. Phelan (NIST, Gaithersburg) at the Department of Mechanical and Industrial Engineering, University of Illinois, Urbana-Champaign, from 1997 to 1998
- Ph.D., Mechanical Engineering (Processing of Polymer Composites), University of Delaware, advisor: Prof. S. G. Advani, 1997.
- M. Tech., Mechanical Engineering (Fluid Mechanics and Heat Transfer), Indian Institute of Technology, Kanpur, India, advisor: Prof. K. Muralidhar, 1991
- B. Tech., Mechanical Engineering, Indian Institute of Technology, Kanpur, India, 1988.

## Positions Held:

- Professor, Mechanical Engineering Department, University of Wisconsin-Milwaukee, 2017(August) to present.
- Visiting Professor at I.I.T.-Delhi (India) in its Applied Mechanics Dept. in the spring of 2019
- Visiting Professor at I.I.T.-B.H.U. (India) in its Mechanical Engineering Dept. in the fall of 2018
- Associate Professor, Mechanical Engineering Department, University of Wisconsin-Milwaukee, 2005 to 2017 (August).

- Visiting Research Fellow at Porous Media Group, Institut de Mecanique des Fluides de Toulouse, Toulouse, France during the 2007-2008 sabbatical leave.
- Assistant Professor, Mechanical Engineering Department, University of Wisconsin-Milwaukee, 1999 to 2005
- Various Fellowships/Research Assistantships during the Ph.D. program, 1992 to 1996.
- Research Associate, Department of Mechanical Engineering, Indian Institute of Technology, Kanpur, India, 1991 to 1992.
- Research Engineer, Metal Cutting R&D unit of Hindustan Machine Tools Ltd., Bangalore, India, 1988 to 1989.

### **Special Honors and Awards**

- Appointed Associate Editor for *Special Topics and Reviews in Porous Media* in 2019.
- Associate Editor for *Journal of Porous Media* since July, 2018.
- Mentor for the newly-created India chapter of INTERPORE in Dec, 2017.
- Given the Excellence in Mentoring Award by the Ronald E. McNair Post-Baccalaureate Achievement Program conducted by UWM-Graduate School on July 26, 2017.
- Feted at UWM Authors Celebration in March 11, 2015
- Chair of the local organizing committee for the 6<sup>th</sup> International Conference on Porous Media in Milwaukee in May27-30, 2014 under the auspices of INTERPORE, the International Society for Porous Media <http://www.interpore.org/>.
- Given the 2014 Annual Interpore Award (the Interpore ‘Rosette’).
- Recognized as a top cited author of a paper published in *AICHE Journal* (2019 impact factor = 3.463) in July, 2014
- Member of the Editorial Board for *Composite Part A: Applied Science and Manufacturing* (2019 impact factor = 6.282) since Jan, 2013.
- Co-Editor of a special issue on thin porous media of *Transport in Porous Media*, vol. 115, issue 3, Dec 2016.

- Member of the scientific committee for FPCM (Flow Processes in Composite Material) conferences since July, 2010.
- Member of the Editorial Board for *Open Journal of Heat, Mass and Momentum Transfer* from April, 2013 till its closure in 2015.
- Recognized for being in top 10 for research expenditures in 2008-2009 by CEAS (College of Engineering and Applied Science) at UWM (University of Wisconsin – Milwaukee)
- Decorated with Research Award by UWM Foundation and Graduate School in 2006
- Promotion with Tenure to Associate Professorship at UWM in 2005
- Winning the prestigious CAREER grant offered by the National Science Foundation of U.S.A. for the outstanding young faculty members in 2004
- Best paper award for the paper “Numerical Modeling of Enhanced Oil Recovery Using Water Injection Method” in 1994-95 by the Institution of Engineers (India).
- Winning the prestigious and extremely competitive university-level fellowship at University of Delaware for two years in a row in 1993-94 and 1994-95.

## RESEARCH ACHIEVEMENTS

### A. Publications

H-index = 31, # of citations = 2892 (source: Google Scholar, March 10, 2020)

#### 1a. Books and Monographs

1. “Wicking in Porous Materials: Traditional and Modern Modeling Approaches,” edited by Reza Masoodi and Krishna.M. Pillai, CRC Press, ISBN 978-1-43-987432-5, Oct 2012.

Chapters contributed in the book (4 out of 12):

- a. “Introduction to Wicking in Porous Media,” R. Masoodi and K.M. Pillai, pages 1-12.
- b. “Traditional Theories of Wicking: Capillary Models,” R. Masoodi and K.M. Pillai, pages 31-53.
- c. “An Introduction to Modeling Flows in Porous Media,” K. M. Pillai and K. Hooman, pages 55-95.
- d. “Single-Phase Flow (Sharp-Interface) Models for Wicking,” R. Masoodi and K.M. Pillai, pages 97-129.

2. “Flow and Transport in Porous Media, An Introduction,” Krishna M. Pillai and M. Quintard, manuscript under preparation, a few chapters and appendices finished, used as class notes in ME 707 (Transport in Porous Media).

## 1b. Book Chapters

1. “Wicking of Liquids under Non-Isothermal and Reactive Conditions: Some Industrial Applications,” M.A.F. Zarandi and Krishna M. Pillai, in *Convection Heat Transfer in Porous Media*, edited by Yasser Mahmoudi, Kamel Hooman and Kambiz Vafai, CRC Press, ISBN-13:978-0-367-03080-3, Nov 2019.
2. “Green composites made from cellulose nanofibers and bio-based epoxy: processing, performance and applications,” Bamdad Barari and Krishna M. Pillai, in *Natural Fibre-reinforced Biodegradable and Bioresorbable Polymer Composites*, edited by Alan Lau, Elsevier, ISBN: 9780081006566, date: March 2017.
3. “Characterization and Processing of Nanocellulose Thermosetting Composites,” Ronald C. Sabo, Rani F. El-Hajjar, Craig M. Clemons, Krishna M. Pillai, in *Handbook of Polymer Nanocomposites. Processing, Performance and Application: Volume C: Polymer Nanocomposites of Cellulose Nanoparticles*, edited by Jitendra K. Pandey, Hitoshi Takagi, Antonio N. Nakagaito and Hyun-Joong Kim, Springer-Verlag, ISBN 9783642452321, 2014.
4. “Advanced Processing Techniques for Composite Materials for Structural Applications,” Rani El-Hajjar, Hua Tan and K.M. Pillai, in *Developments in fiber-reinforced polymer (FRP) composites for civil engineering*, edited by N. Uddin, Woodhead Publishing limited, ISBN 978-0-85709-234-2, 2013.
5. “Modeling the Processing of Natural Fiber Composites made using Liquid Composites Molding,” R. Masoodi and K.M. Pillai, *Handbook of Bioplastics and Biocomposites, Engineering Applications*, edited by Dr. Srikanth Pilla, Publisher: Wiley-Scrivener, ISBN 978 0-470-62607-8, 2011.
6. “Processing Polymer Matrix Composites for Blast Protection,” Hua Tan and Krishna M. Pillai, in *Blast protection of civil infrastructures and vehicles using composites*, edited by N. Uddin, Woodhead Publishing limited and CRC Press LLC, CRC Press, ISBN 978-1-4398-2771-0, 2010.

## 2a. Scholarly Publications in Refereed Journals

1. “A pore-network study on the factors influencing the isothermal drying of single- & dual-scale porous media,” Zhenyu Xu and K.M. Pillai, accepted for publication in *Drying Technology*.
2. “Towards developing a low-cost gravity-driven arsenic filtration system using iron oxide nanoparticle-loaded PU Foam,” A. Pillai, M.A.F. Zarandi, F. Hussein, K. Pillai, N. Abu-Zahra, to appear in *Water Quality Research Journal*.
3. “A new efficient mass-exchange closure for modeling unsaturated flows and mass-transport processes in thin porous media,” A. Kaffel, K. Pillai, J. Feldkamp, T. Tower, *International Journal of Heat and Mass Transfer*, v 140, pp 1055-1073, Sep 2019.
4. “Longitudinal and Transverse Flows in Fiber Tows: Evaluation of Theoretical Permeability Models through Numerical Predictions and Experimental Measurements,” M.A.F. Zarandi, S. Arroyo, K.M. Pillai, *Composites Part A: Applied Science and Manufacturing*, v 119, pp 73-87, April 2019.
5. “Fast and Inexpensive 2D-Micrograph based method of Permeability Estimation through Micro-Macro Coupling in Porous Media,” B. Barari, S. Beyhaghi, K.M. Pillai, *Journal of Porous Media*, v 22, n 7, pp 831-849, 2019.
6. “Flow Along and Across Glass-Fiber Wicks: Testing of Permeability Models through Experiments and Simulations,” M.A.F. Zarandi, K.M. Pillai, B. Barari, *AIChE Journal*, v 64, n 9, pp 3491-3501, Sep 2018.
7. “A Novel Method for Permeability Estimation from Micro-Tomographic Images,” S. Paul, S. Roy, P. Ghosh, M.A.F. Zarandi, T. Cender, K.M. Pillai, *Transport in Porous Media*, v 122, n 3, April 2018.
8. “Spontaneous Imbibition of Liquids in Glass-Fiber Wicks. Part 1: Usefulness of a Sharp-Front Approach,” M.A.F. Zarandi, K.M. Pillai, A.S. Kimmel, *AIChE Journal*, 63: 294-305, 2018.
9. “Spontaneous Imbibition of Liquid in Glass fiber Wicks, Part II: Validation of a Diffuse-front Model,” M.A.F. Zarandi and K.M. Pillai, *AIChE Journal*, 64: 306–315, 2018.
10. “Pressure Infiltration Process to Synthesize Metal Matrix Composites- A Review of Metal Matrix Composites, the Technology and Process Simulation,” R. Etemadi, B.

- Wang, K.M. Pillai, B. Niroumand, E. Omrani and P. Rohatgi, *Materials and Manufacturing Processes*, v 33, issue 12, pp 1261-1290, 2018.
11. "Modeling drying in thin porous media after coupling pore-level drying dynamics with external flow field," Z. Xu and K.M. Pillai, *Drying Technology*, v 35, n 7, pp 785-801, 2017.
  12. "Analyzing slow drying in a porous medium placed adjacent to laminar air flow using a pore-network model," Z. Xu and K.M. Pillai, *Numerical Heat Transfer; Part A: Applications*, v 70, n 11, pp 1213-1231, 2016.
  13. "Mechanical, Physical and Tribological Characterization of Nano-Cellulose Fibers Reinforced Bio-Epoxy Composites: An Attempt to Fabricate and Scale the 'Green' Composite", Bamdad Barari, Emad Omrani, Afsaneh Dorri Moghadam, Pradeep L. Menezes, Krishna M. Pillai, Pradeep K. Rohatgi, *Carbohydrate Polymers*, v 147, pp 282-93, Aug 20, 2016.
  14. "Achieving the inside-outside coupling during network simulation of isothermal drying of a porous medium in a turbulent flow," S. Beyhaghi, Z. Xu and K.M. Pillai, *Transport in Porous Media*, v 114, n 3, pp. 823-842, Sep 2016.
  15. "Mechanical Characterization of Scalable Cellulose Nano-Fiber Based Composites made using Liquid Composite Molding Process," B. Barari, T.K. Ellingham, I.I. Qamhia, K.M. Pillai, R. Al-Hajjar, L.-S. Turng and R. Sabo, *Composites Part B*, v 84, pp 277-284, 2016.
  16. "Mechanical and tribological properties of self-lubricating bio-based carbon fabric epoxy composites made using liquid composite molding," E. Omrani, B. Barari, A. D. Moghadam, K. M. Pillai, and P. Rohatgi, *Tribology International*, v 92, pp 222–232, December 2015.
  17. "Liquid flow in polyurethane foams for filtration applications: A study on their characterization and permeability estimation," S. Gunashekar, K.M. Pillai, B.C. Church, N.H. Abu-Zahra, *Journal of Porous Materials*, Volume 22, Issue 3, pp 749–759, June 2015.
  18. "Search for a 'Green' Composite Material: An Attempt to Fabricate Cellulose Nano-Fiber Composites using Liquid Composite Molding," B. Barari and K. M. Pillai, *Journal of the Indian Institute of Science*, v 95:3, Jul.-Sep. 2015, journal.iisc.ernet.in
  19. "On Porosity Formation in Metal Matrix Composites made with Dual-Scale Fiber Reinforcements using Pressure Infiltration Process," R. Etemadi, K.M. Pillai, P.K. Rohatgi, S.A. Hamidi, *Metallurgical and Materials Transactions A*, Volume 46, Issue 5, Pages 2119-2133, 2015.

20. "Single-Phase Flows in Swelling, Liquid-Absorbing Porous Media: A Derivation of Flow Governing Equations using the Volume Averaging Method with a Non-Deterministic, Heuristic Approach to assessing the Effect of Solid-Phase Changes," K. M. Pillai , *Journal of Porous Media*, v 17, n 10, pp. 915-935, 2014.
21. "Experimental Determination of the Permeability of Engineering Textiles: Benchmark II," N. Vernet; E. Ruiz; S. Advani; J.B. Alms; M. Aubert; M. Barburski; B. Barari; J.M. Beraud; D.C. Berg; N. Correia; M. Danzi; T. Delavière; M. Dickert; C. Di Fratta; A. Endruweit; P. Ermanni; G. Francucci; J.A. Garcia; A. George; C. Hahn; F. Klunker; S.V. Lomov; A. Long; B. Louis; J. Maldonado; R. Meier; V. Michaud; H. Perrin; K. Pillai; E. Rodriguez; F. Trochu; S. Verheyden; M. Weitgreffe; W. Xiong; S. Zaremba; G. Ziegmann; *Composites Part A: Applied Science and Manufacturing*, v 61, pp. 172-184, 2014.
22. "Wicking and Evaporation of Wicks in Porous Wicks: A Simple Analytical Approach to Optimization of Wick Design," S. Beyaghi, S. Geoffroy, M. Prat, K.M. Pillai, *AIChE Journal*, v 60, n 5, May 2014.
23. "Calibration of one-dimensional flow setup used for estimating fabric permeability using three different reference media," B. Barari and K.M. Pillai, *Polymer Composites*, v 37, n 3, pp. 925-935, 2014.
24. "A Combined Experimental/Numerical Approach to Study the Thermal Dispersion in Porous Media Flows," E.M. Languri, K.M. Pillai, H. Tan, *Thermal Science*, v 18, n 2, pp. S463-S474, 2014.
25. "Modeling Isothermal Flow in Saturated Porous Media Compressing between Two Parallel Plates," Reza Masoodi, Krishna M Pillai, Vahid Mortazavi, Alireza Ostadhossein, *Open Journal of Heat, Mass and Momentum Transfer*, v 1, n 2, pp. 74-83, 2013.
26. "Numerical Simulation of Pressure Infiltration Process for making Metal Matrix Composites using Dual-Scale Fabrics," Wang Bo and Krishna M. Pillai, *Metallurgical and Materials Transaction A*, v 44A, pp. 5834-5852, Dec 2013.
27. "A fast numerical simulation for modeling simultaneous metal flow and solidification in thin cavities using the lubrication approximation," A. Reikher and K.M. Pillai, *Numerical Heat Transfer, Part A: Applications*, v 63, n 2, pp. 75-100, 2013.
28. "A Fast Simulation of Transient Metal Flow and Solidification in a Narrow Channel, Part I: Model Development" A. Reikher and K.M. Pillai, *International Journal of Heat and Mass Transfer*, v 60, pp. 797-805, 2013.

29. "A Fast Simulation of Transient Metal Flow and Solidification in a Narrow Channel, Part II: Model Validation and Parametric Study" A. Reikher and K.M. Pillai, *International Journal of Heat and Mass Transfer*, v 60, pp. 806-815, 2013.
30. "On Applying an External-Flow Driven Mass Transfer Boundary Condition to Simulate Drying from a Pore-Network Model," M.R. Shaeri, S. Beyaghi and K.M. Pillai, *International Journal of Heat and Mass Transfer*, n 57, pp. 331-344, 2013.
31. "Drying of a Porous Medium with Multiple Open sides Using a Pore-Network Model Simulation," M.R. Shaeri, S. Beyhaghi and K.M. Pillai, *International Communications in Heat and Mass Transfer*, v 39, n 9, p 1320-1324, November 2012.
32. "A Study on Moisture Absorption and Swelling in Bio-Based Jute-Epoxy Composites," R. Masoodi and K.M. Pillai, *Journal of Reinforced Plastics and Composites*, v 31, n 5, p 285-294, March 2012.
33. "Mechanical characterization of cellulose nanofiber and bio-derived epoxy composite," R. Masoodi, R.E. Hajjar, K.M. Pillai, and R. Sabo, *Materials and Design*, v 36, p 570-576, April 2012.
34. "A General Formula for Capillary Suction Pressure in Porous Media," R. Masoodi and K.M. Pillai, *Journal of Porous Media*, 15(8), pp 775-783, 2012.
35. "Numerical Simulation of Liquid Absorption in Paper-Like Swelling Porous Media," R. Masoodi, H. Tan, and K.M. Pillai, *AIChE Journal*, v 58, n 8, pp. 2536-2544, Aug 2012.
36. "Numerical Simulation of LCM Mold-Filling during the Manufacture of Natural Fiber Composites," R. Masoodi, K.M. Pillai, N. Grahl, and H. Tan, *Journal of Reinforced Plastics and Composites*, v31, issue 6, p 363-378, March 2012.
37. "Multiscale Modeling of Unsaturated Flow in Dual-Scale Fiber Preforms of Liquid Composite Molding I: Isothermal Flows," Hua Tan and K.M. Pillai, *Composites Part A: Applied Science and Manufacturing*, v 43, n 1, pp. 1-13, Jan 2012.
38. "Multiscale Modeling of Unsaturated Flow in Dual-Scale Fiber Preforms of Liquid Composite Molding II: Non-isothermal Flows," Hua Tan and K.M. Pillai, *Composites Part A: Applied Science and Manufacturing*, v 43, n 1, p 14-28, Jan 2012.
39. "Multiscale Modeling of Unsaturated Flow in Dual-Scale Fiber Preforms of Liquid Composite Molding III: Reactive Flows," Hua Tan and K.M. Pillai, *Composites Part A: Applied Science and Manufacturing*, v 43, n 1, pp. 29-44, Jan 2012.
40. "Darcy's Law Based Numerical Simulation for Modeling 3-D Liquid Absorption into Porous Wicks," R. Masoodi, H. Tan, and K.M. Pillai, *AIChE Journal*, v 57, n 5, pp. 1132-1143, May 2011.



41. "Estimation of Tortuosity and Effective Diffusivity Tensors using Closure Formulation in a Sintered Polymer Wick during Transport of a Nondilute, Multicomponent Liquid-Mixture", S. Beyhaghi and K.M. Pillai, *Special Topics & Reviews in Porous Media - An International Journal*, Vol. 2, issue 4, pp. 267-282, 2011.
42. "Evaporation and Transport of Non-Dilute, Multi-Component Liquid Mixtures in Porous Wicks: Simulation and Experimental Validation", S. Beyhaghi, K.M. Pillai, D. T. Qadah, and M. L. Dietz, *International Journal of Heat and Mass Transfer*, v 54, pp.5216-5230, 2011.
43. "Effect of aspect ratio on measured permeability and flow-front progress in 1D flow experiment," E.M. Languri and K.M. Pillai, *International Journal of Fluid Mechanics Research*, v 38, n 6, 2011.
44. "Fast Liquid Composite Molding Simulation of Unsaturated Flow in Dual-Scale Fiber Mats Using the Imbibition Characteristics of a Fabric-Based Unit Cell", H. Tan and K.M. Pillai, *Polymer Composites*, vol. 31, issue 10, p 1790-1807, 2010.
45. "Numerical Simulation of Reactive Flow in Liquid Composite Molding Using Flux-Corrected Transport (FCT) Based Finite Element/Control Volume (FE/CV) Method," Hua Tan and K.M. Pillai, *International Journal of Heat and Mass Transfer*, v 53, p 2256-2271, 2010.
46. "Effect of Externally Applied Liquid Pressure on Wicking in Paper Wipes," R. Masoodi, K.M. Pillai and P.P. Varanasi, *Journal of Engineered Fibers and Fabrics*, vol. 5, no. 3, p 49-66, 2010.
47. "Design and Evaluation of an Idealized Porous Medium for Calibration of Permeability Measuring Devices," A. Vechart, R. Masoodi, and K.M. Pillai, *Advanced Composites Letters*, Vol. 19, No. 1, p 35-49, 2010.
48. "Darcy's Law based Model for Wicking in Paper-Like Swelling Porous Media," R. Masoodi and K.M. Pillai, *AIChE Journal*, v 56, n 9, pp. 2257-2267, Sep 2010.
49. "A Deviation from Darcy's Law: an implication of unsaturated flow in dual-scale porous media," M. Munagavalasa and K.M. Pillai, *Journal of Porous Media*, v 12, n 4, p 327-344, 2009.
50. "Finite element implementation of stress-jump and stress-continuity conditions at porous-medium, clear-fluid interface," Hua Tan and K.M. Pillai, *Computers & Fluids*, v 38 (n 6), p 1118-1131, 2009.

51. "A method to estimate the accuracy of radial flow-based permeability measuring devices," Hua Tan and K.M. Pillai, *Journal of Composite Materials*, 43(21), p 2307-2332, 2009.
52. "A Study on Slow Evaporation of Liquids in a Dual-Porosity Porous Medium using Square Network Model", K. M. Pillai, M. Prat, M. Marcoux, *International Journal of Heat and Mass Transfer*, v 52, n 7-8, p 1643-1656, March 2009.
53. "Effect of fiber-mat anisotropy on 1D mold filling in LCM: A numerical investigation," Hua Tan and K.M. Pillai, *Polymer Composites* 29 (8), p 869-882, 2008.
54. "Darcy's Law based Models for Liquid Absorption in Polymer Wicks," R. Masoodi, K. M. Pillai and P.P Varanasi, *AIChE Journal*, v 53, n.11, p 2769-2782, 2007.
55. "Variations in unsaturated flow with flow direction in resin transfer molding: An experimental investigation," Hua Tan, T. Roy and K.M. Pillai, *Composites Part A: Applied Science and Manufacturing*, v 38, n8, p 1872-1892, 2007.
56. "A method to estimate the accuracy of 1-D flow based permeability measuring devices," T. Roy, Hua Tan and K.M. Pillai, *Journal of Composite Materials*, v 41, n 17, p 2037-2055, 2007.
57. "An estimation of effective thermal conductivity of a fibrous dual-scale porous medium during unsaturated flow", M. Munagavalasa and K.M. Pillai, *International Journal of Heat and Mass Transfer*, 49, p 317-328, 2006.
58. "Characterization of dual-scale fiber mats for unsaturated flow in liquid composite molding," T. Roy and K.M. Pillai, *Polymer Composites*, 26(6): 756-769, Dec 2005.
59. "A Numerical Study of Non-Isothermal Reactive Flow in a Dual-Scale Porous Medium under Partial Saturation", K.M. Pillai and R.S. Jadhav, *Numerical Heat Transfer, Part A: Applications*, 46: 1-28, 2004.
60. "Unsaturated flow in liquid composite molding processes: a review and some thoughts", K.M. Pillai, *Journal of Composite Materials*, v 38, n 23, p2097-2118, Dec 2004.
61. "Governing equations for unsaturated flow through woven fiber mats, Part 2: Nonisothermal reactive flows", K.M. Pillai and M.S. Munagavalsa, *Composites Part A: Applied Science and Manufacturing*, v 35, p 403-415, 2004.
62. "Experimental Investigation of the effect of fiber-mat architecture on the unsaturated flow in liquid composite molding", B.Z. Babu and K. M. Pillai, *Journal of Composite Materials*, v 38, n 1, p 57-79, 2003.
63. "A Numerical Study of Heat Transfer during Unsaturated Flow in Dual-Scale Porous Media", R.S. Jadhav and K.M. Pillai, *Numerical Heat Transfer, Part A: Applications*, v 43, p385-407, 2003.

64. "Governing Equations for Unsaturated Flow through Woven Fiber Mats: Part 1 Isothermal Flows", K. M. Pillai, *Composites Part A: Applied Science and Manufacturing*, v33, p 1007-1019, 2002.
65. "Investigation of Unsaturated Flow in woven, braided and stitched fiber mats during mold filling in Resin Transfer Molding", J. Slade, K. M. Pillai and S. G. Advani, *Polymer Composites*, v 22, n 4, p 491-505, Aug. 2001.
66. "Numerical Simulation of Injection/Compression Liquid Composite Molding. Part 2: Preform Compression", K. M. Pillai, F. R. Phelan Jr. and C. L. Tucker III, *Composites Part A: Applied Science and Manufacturing*, v 32, n 2, p 207-220, Feb 2001.
67. "Numerical Simulation of Crystallization in High Density Polyethylene Fibers", K. M. Pillai, A. Benard, K. I. Jacob and S. G. Advani, *Polymer Engineering and Science*, v 40, n 11, p 2356-2373, Nov 2000.
68. "Numerical Simulation of Injection/Compression Liquid Composite Molding. Part 1: Mesh Generation", K. M. Pillai, F. R. Phelan Jr. and C. L. Tucker III, *Composites Part A: Applied Science and Manufacturing*, v 31, n 1, p 87-94, Jan 2000.
69. "Numerical Simulation of Unsaturated Flow in Woven or Stitched Fiber Mats in Resin Transfer Molding", K. M. Pillai and S.G. Advani, *Polymer Composites*, v 19, n 1, p 71-80, Feb 1998.
70. "A Model for Unsaturated Flow in Woven or Stitched Fiber Mats during mold filling in Resin Transfer Molding", K. M. Pillai and S. G. Advani, *Journal of Composite Materials*, v 32, no. 19, p1753-1783, 1998.
71. "A Simple Model for the Variation of Permeability due to Partial Saturation in Dual Scale Porous Media", Y.D. Parseval, K. M. Pillai and S. G. Advani, *Transport in Porous Media*, 27, p 243-264, 1997.
72. "Wicking across a Fiber-bank", K. M. Pillai and S. G. Advani, *Journal for Colloid and Interface Science*, v 183, no.1, p100-110, 1996.
73. "Numerical and Analytical Study to Estimate the Effect of Two Length Scales upon the Permeability of a Fibrous Porous Medium", K. M. Pillai and S. G. Advani, *Transport in Porous Media*, v 21, pp.1-17, 1995.
74. "A Numerical Study of Oil Recovery Using Water Injection Method", K. M. Pillai and K. Muralidhar, *Numerical Heat Transfer Part A: Applications*, v 24, No. 3, pp. 305-322, 1993.
75. "Application of an Operator Splitting Algorithm for Advection-Diffusion Problems", K. Muralidhar, Verghese and K. M. Pillai, *Numerical Heat Transfer Part A : Applications*, V 23, No 1, pp.99-113, 1993.

76. "Numerical Modeling of Enhanced Oil Recovery Using Water Injection Method", K. M. Pillai and K. Muralidhar, *The Journal of Institution of Engineers (India)*, 1992.

## **2b. Trade Journal (Non-Peer Reviewed) Articles**

1. "Natural Convection – An Overlooked Phenomenon of the Solidification Process," A. Reikher, H. Gerber, K.M. Pillai, T.-C. Jen, *Die Casting Engineer*, Jan 2010.
2. "Application of 1-D numerical simulation to optimize process parameters of a thin wall casting in high pressure die casting," A. Reikher, H. Gerber, K.M. Pillai, T.-C. Jen, *Die Casting Engineer*, 2009.

## **2c. Scholarly Publications in Refereed Journals (manuscripts under preparation/review)**

1. "Numerical simulation of solidification microstructure with extended fiber cooling for making fiber-reinforced aluminum matrix composites," Z. Yang, R. Etemadi, B. Wang, K.M. Pillai, submitted for review to *Metallurgy and Materials Transactions A*.
2. "Analytical solutions of unsteady starting flow of a viscous liquid in a pipe undergoing axial oscillations," A. Kaffel, K.M. Pillai, to be resubmitted to *Journal of Engineering Mathematics* after 1<sup>st</sup> review.
3. "A Validation of Whitaker's Closure Formulation based Method for Permeability Estimation," A. Raizada, P. Ghosh, K.M. Pillai, M.A.F. Zarandi, B. Barari, P. Shukla, to be submitted for publication.

## **3. Conference Proceedings and Abstracts**

### **3a. Peer-Reviewed Papers in Conference Proceedings**

1. "Mechanical Testing of Scalable Cellulose Nano-fiber based Composites made using LCM Process," B. Barari, T. K. Ellingham, I. I. Qamhia, K. M. Pillai, R. El-Hajjar, Lih-Sheng Turng, R. Sabo, Proceedings of 19<sup>th</sup> International Conference on Composites Materials (19<sup>th</sup> ICCM), Montreal, Canada, July 28- Aug 2, 2013.
2. "An experimental estimation of Liquid Absorption Coefficient for Cellulose Nano-Fiber Films," A. Javadi, K.M. Pillai and R. Sabo, Proceedings of 11th International Conference on Flow Processes in Composite Materials (FPCM11), Auckland, New Zealand, July 9-12, 2012.
3. "Investigation of Resin Flow in Woven (Dual-Scale) Jute Fabrics through the Two-Color Experiment," R. Masoodi, A. Javadi and K.M. Pillai, Proceedings of 11th International Conference on Flow Processes in Composite Materials (FPCM11), Auckland, New Zealand, July 9-12, 2012.

4. "Numerical Simulation of Pressure Infiltration Process for Making Metal Matrix Composites: Effect of Process Parameters," B. Wang and K.M. Pillai, in *CPE: Science and Engineering of Light Metal Matrix Nanocomposites and Composites*, the proceedings of 2012 TMS Annual Meeting & Exhibition, held in Orlando, Florida, March 11-15, 2012.
5. "An Experimental Study on Swelling of Cellulose Nano-Fiber Films in Epoxy Resins and Water," R. Masoodi, A. Javadi and K.M. Pillai, R. Sabo, *2011 Spring SAMPE Technical Conference and Exhibition – State of the Industry: Advanced Materials, Applications, and Processing Technology*, International SAMPE Technical Conference, 2011.
6. "An Experimental Study on Crack Propagation in Green Composites made from Cellulose Nanofibers and Epoxy," R. Masoodi, R.E. El-Hajjar, K.M. Pillai, A. Javadi, and R. Sabo, *2011 Spring SAMPE Technical Conference and Exhibition – State of the Industry: Advanced Materials, Applications, and Processing Technology*, International SAMPE Technical Conference, 2011.
7. "Evaporation of a Non-Dilute, Multi-Component Liquid Mixture from a Porous Wick", S. Beyhaghi, K.M. Pillai, D.T. Qadah and M.L. Dietz, Proceedings of the 3rd International Conference on Porous Media and its Applications in Science and Engineering (ICPM3), Montecatini, Italy, June 20-25, 2010.
8. "Study of the Closure Problem for Prediction of Tortuosity and Dispersion Tensor during Multicomponent Transport in a Consolidated Porous Medium", S. Beyhaghi and K.M. Pillai, Proceedings of the 3rd International Conference on Porous Media and its Applications in Science and Engineering (ICPM3), Montecatini, Italy, June 20-25, 2010.
9. "An Approach to Model Resin Flow through Swelling Porous Media made of Natural Fibers," E.M. Languri, R.D. Moore, R. Masoodi, K.M. Pillai and R. Sabo, Proc. of 10th International Conference on Flow Processes in Composite Materials (FPCM10), Monte Verità, Ascona, Switzerland, July 11-15, 2010.
10. "Modeling Unsaturated Flow in Dual-Scale Fiber Mats of Liquid Composite Molding: Some Recent Developments," Hua Tan and Krishna M. Pillai, Proc. of 10<sup>th</sup> International Conference on Flow Processes in Composite Materials (FPCM10), Monte Verità, Ascona, Switzerland, July 11-15, 2010.
11. "A Reference Porous Medium made by Rapid Prototyping as a Calibration Tool for Permeability Measurement," E.M. Languri, G.L. Bennett III, R. Masoodi and K.M. Pillai, Proc. of 10th International Conference on Flow Processes in Composite Materials (FPCM10), Monte Verità, Ascona, Switzerland, July 11-15, 2010.

12. "Multiscale Modeling of Isothermal Unsaturated Flow in Dual-Scale Fiber Preforms of Liquid Composite Molding," Hua Tan and Krishna. M. Pillai, *SAMPE 2010*, May 17-20. Seattle, WA, 2010.
13. "Flow Modeling in Natural-Fiber Preforms used in Liquid Composite Molding," R. Masoodi, K.M. Pillai and M.A. Verhagen, Proc. of 1st joint American-Canadian International Conference on Composites, Delaware, USA, September 15-17, 2009.
14. "A Study of Change in Properties of Polymer Composite after the Replacement of Glass with Jute Fibers," M.A. Verhagen, T. Duelle, K.M. Pillai and R. Masoodi, Proc. of 1st joint American- Canadian International Conference on Composites, Delaware, USA, September 15-17, 2009.
15. "Role of Hydraulic and Capillary Radii in Improving the Effectiveness of Capillary Model in Wicking," R. Masoodi, K.M. Pillai and P.P. Varanasi, Proc. of FEDSM2008, 2008 ASME Fluids Engineering Division Summer Conference, Jacksonville, FL, USA, August 10-14, 2008.
16. "Boundary conditions at the interface between the clear-fluid and porous medium domains," Hua Tan, X. Chen, K. M. Pillai and T. D. Papathanasiou, 9<sup>th</sup> International Conference on Flow Processes in Composite Materials (FPCM 9), Montreal, Canada, 8-10 July, 2008.
17. "Effect of Preform Aspect Ratio on Permeability measured through 1D Flow Experiments," Ehsan M. Languri, Andrew Vechart, Hua Tan and Krishna M. Pillai, 9th International Conference on Flow Processes in Composite Materials (FPCM9), Montreal, 8-10 July, 2008.
18. "Prediction of Permeability in a Dual-Scale Fiber Mat using Two Different Unit Cells," Hua Tan, Ehsan M. Languri and Krishna M. Pillai, 9th International Conference on Flow Processes in Composite Materials (FPCM9), Montreal, 8-10 July, 2008.
19. "Effect of Preform Aspect Ratio on the Transient 1-D Mold Filling in LCM," Ehsan M. Languri, Hua Tan and Krishna M. Pillai, 9th International Conference on Flow Processes in Composite Materials (FPCM9), Montreal, 8-10 July, 2008.
20. "Recent Advances in Modeling Unsaturated Flow in LCM Processes used for Manufacturing Polymer Composites," K.M. Pillai, Proceedings of Second International Conference on Porous Media and its Applications in Science, Engineering and Industry, Kauai, Hawaii, June 17-22, 2007.
21. "A New Method to Estimate Permeability of Isotropic Fiber Mats through Radial Flow," Hua Tan and Krishna M. Pillai, Proceedings of SAMPE 2007 Conference, Baltimore, MD, June 3-7, 2007.

22. "Calibration of 1-D Flow and Radial Flow Based Permeability Measuring Devices," Hua Tan, Tonmoy Roy and Krishna M. Pillai, Proceedings of SAMPE 2007 Conference, Baltimore, MD, June 3-7, 2007.
23. "Deviation from Darcy's Law: An Implication of Unsaturated Flow in Dual-Scale Fiber Mats in LCM," M. Munagavalasa and K. M. Pillai, Proceedings of 8th International Conference on Flow Processes in Composites Materials (FPCM8), Douai, France, 11-13 July, 2006.
24. "Investigation of direction-dependent unsaturated flow in anisotropic dual-scale fiber-mats of LCM," T. Roy and K. M. Pillai, Proceedings of 8th International Conference on Flow Processes in Composites Materials (FPCM8), Douai, France, 11-13 July, 2006.
25. "Experimental investigations of the unsaturated flow in liquid composite molding," T. Roy, C. Dulmes, and K.M. Pillai, Proceedings of the 5th Canadian-International Conference (CANCOM 2005), Vancouver, Canada, August 16-19, 2005.
26. "Some studies on modeling the unsaturated flow in woven, stitched or braided fiber mats in LCM", T. Roy, B.Z. Babu, R.S. Jadhav, M.S. Munagavalasa and K.M. Pillai, Proceedings of the 7th International Conference on Flow Processes in Composites Materials (FPCM7), Newark, DE, USA, July 7-10, 2004.
27. "First steps towards quantitative validation of the unsaturated flow theories in liquid composite molding", T. Roy, B.Z. Babu and K.M. Pillai, Proceedings of ASME International: Summer Heat Transfer Conference, Las Vegas (Nevada), July 21-23, 2003.
28. "Investigation of heat transfer and cure during the unsaturated flow in woven, stitched and braided mats", R.S. Jadhav and K.M. Pillai, Proceedings of ASME International: Summer Heat Transfer Conference, Las Vegas (Nevada), July 21-23, 2003.
29. "New Experimental Findings on Resin Impregnation Process for Woven, Stitched or Braided Fiber Mats in Liquid Composite Molding", B.Z. Babu and K.M. Pillai, 47<sup>th</sup> International SAMPE Symposium Conference Proceedings, May 2002.
30. "Micro-macro Coupling in Semi-crystalline Polymers", S. G. Advani, A. Benard, K. M. Pillai and K. I. Jacob, The 1998 International Mechanical Engineering Congress and Exposition by ASME, Anaheim (CA), November 1998.
31. "Modeling Mold Filling in Injection/Compression Liquid Composite Molding", K. M. Pillai, F. R. Phelan Jr. and C. L. Tucker III, American Society for Composites Meeting, Baltimore, September 1998.

32. "Injection/Compression Liquid Composite Molding 3-D Flow Simulation", F. R. Phelan Jr., K. M. Pillai and C. L. Tucker III, AIChE Annual Meeting, November 1997.
33. "Some Mold Filling Issues in Liquid Composite Molding Processes: Modeling and Experiments", S. Bickerton, P. Simacek, J. Mogavero, K. M. Pillai and S. G. Advani, ANTEC97 held by the Society of Plastics Engineers, Toronto, April-May 1997.
34. "Modeling of Void Migration in Resin Transfer Molding Process", K. M. Pillai and S. G. Advani, Proceedings of the 1996 ASME International Mechanical Engineering Congress & Exhibition, Nov 17-22, Atlanta GA, 14p, 1996.
35. "A Two Layer Model of Permeability in the Unsaturated Flow Regime for a woven RTM preform", K. M. Pillai and S. G. Advani, American Society for Composites meeting, September 1994.
36. "Modeling the Heterogeneities Present in Preforms During Mold Filling in RTM", K. M. Pillai, M. Brusckhe, T. Luce, R. Parnas and S. G. Advani, 25th International SAMPE Technical Conference, Philadelphia, October 1993.
37. "Operator Splitting Algorithm for Advection Diffusion Problems", K. Muralidhar, Verghese and K. M. Pillai, 9th National Heat and Mass Transfer Conference, I.I.T. Madras (India), December 1991.

### **3b. Presentations and Talks in Conferences and Workshops**

1. "Permeability for flow along and across fibers in fiber tows: Testing of permeability models through tow-scale experiments and simulations," M.A.F. Zarandi, S. Arroyo and K.M. Pillai, FPCM 14 (The 14<sup>th</sup> International Conference on Flow Processing in Composite Materials), Lulea (Sweden), May 30-June 1, 2018.
2. "Application of sharp- and diffuse-front models for predicting mass gain and saturation in fibrous wicks," K.M. Pillai and M.A.F. Zarandi, presented in mini-symposium M.14 on Wicking, INTERPORE 10, New Orleans (USA), May 14-17, 2018.
3. "Wicking as partially-saturated flow of a liquid in thin porous media," A. Kaffel and K.M. Pillai, presented in the mini-symposium on thin porous media, INTERPORE 10, New Orleans (USA), May 14-17, 2018.
4. **Invited Inaugural Talk:** "Spontaneous Liquid imbibition in industrial wicks: comparing the effectiveness of sharp- and diffuse-front models," K. M. Pillai, Kick-off meeting of India chapter of Interpore, Dec 14, 2017, I.I.T.-Delhi, India.
5. **Invited Talk:** "Current Challenges in Upscaling Multiphase Flows in Porous Media using the Volume Averaging Method," K. M. Pillai, XXIV ICTAM (International



Congress of Applied and Theoretical Mechanics), Aug 21-26, 2016, Montreal, Canada.

6. **Invited Talk:** “Use of sharp interfaces in flow models to predict wetting of industrial porous media,” K.M. Pillai, MIMENIMA Symposium, Sep 28-30, 2015, Grömitz, Germany.
7. "Mechanical and Tribological Characterization of NanoCellulose Fibers Reinforced BioEpoxy Composites", B. Barari, K.M. Pillai, 2016 STLE Annual Meeting & Exhibition, May 15-19, 2016, at the Bally's Las Vegas Hotel & Casino, Las Vegas, USA.
8. "Novel Processing and Characterization of Cellulose Nano-Composite made from Improvised Liquid Composite Molding Process", B. Barari, K.M. Pillai, 8th International Conference on Porous Media & Annual Meeting of the International Society for Porous Media, May 9 - 12, 2016, Cincinnati, USA.
9. “Estimating Permeability of Polyurethane (PU) Foams using 3D Micro-CT Images”, M. A. F. Zarandi, K. M. Pillai, , 8th International Conference on Porous Media & Annual Meeting of the International Society for Porous Media, May 9 - 12, 2016, Cincinnati, USA.
10. “Establishing Mass-Balance Equation for Single-Phase Flows in Swelling, Liquid-Absorbing Porous Media made from Cellulose Nano-Fibers”, B. Barari and K.M. Pillai, a talk presented at 7<sup>th</sup> International Conference on Porous Media organized by Interpore, May 18-21, 2015, Padova, Italy.
11. “Reactive Flows in Dual-Scale Fabrics: Model Development using the Volume Averaging Method and its Validation,” K.M. Pillai, a talk presented at the minisymposium on composites processing, 5<sup>th</sup> International Conference on Porous Media organized by Interpore, Prague, May 21-24, 2013.
12. “Coupling Mass Transfer in Inner and Outer Flows while Modeling Drying from a Pore-Network Model,” M.R. Shaeri, S. Beyaghi and K.M. Pillai, a talk presented at 4<sup>th</sup> International Conference on Porous Media and its Applications in Science, Engineering and Industry, Potsdam (Germany), June 17-22, 2012.
13. “Experimental and Theoretical Validation of Permeability obtained using the Closure Formulation for Sintered Polymer Wicks,” S. Beyaghi and K.M. Pillai, a talk presented at 4<sup>th</sup> International Conference on Porous Media (INTERPORE 4), Purdue University, May 14-16, 2012.
14. “Drying Simulation of a Porous Medium Using a Pore-Network Model with Multiple Open-Sides,” M.R. Shaeri, S. Beyaghi and K.M. Pillai, a talk presented at 4<sup>th</sup> International Conference on Porous Media (INTERPORE 4), Purdue University, May 14-16, 2012.

15. "A Study of Mechanical Properties of Cellulose Nanofiber Composites made using Resin Transfer Molding," R. Masoodi, K.M. Pillai, R. E. Hajjar, and R. Sabo, a talk presented at 11th International Conference on Wood & Biofiber Plastic Composites, Madison, Wisconsin, May 16-17, 2011.
16. "An Experimental Study on Mechanical Properties of Green Composites Made Using Cellulose Nanofiber Films," R. Masoodi, Benton J. Weibel, K.M. Pillai, R.E. Hajjar, and R. Sabo, a talk presented at 2011 ASME International Mechanical Engineering Congress and Exposition, Denver, Colorado, November 11-17, 2011.
17. **Invited Talk:** "Modeling Unsaturated Flow in Dual-Scale Porous Media," 1<sup>st</sup> International Conference on Porous Media & Annual Meeting of the International Society for Porous Media, March 14 - 17, 2009, ITWM, Kaiserslautern, Germany .
18. **Invited Talk:** "Recent Advances in Modeling Unsaturated Flow in LCM Processes used for Manufacturing Polymer Composites," K.M. Pillai, Industrial Porous Media Workshop at Utricht University in Holland, Oct. 2007.
19. "Variations in the unsaturated flow with flow direction in liquid composite molding," T. Roy and K.M. Pillai, a talk presented at IMECE (International Mechanical Engineering Congress & Exposition) 2005, Orlando (FL), USA, Nov 5-11, 2005.

### **3c. Posters at Conferences and Workshops**

1. "Modeling Drying in Thin Porous Media after Coupling Pore-Level Drying Dynamics with External Flow Field," Z. Xu and K.M. Pillai, 8<sup>th</sup> International Conference on Porous Media & Annual Meeting of the International Society for Porous Media, May 9 - 12, 2016, Cincinnati, USA.
2. "Pressure Infiltration Process for Synthesis of Graphene Reinforced Nano-Metal Matrix Composites," R. Etemadi, K.M. Pillai, and P. Rohatgi, 8<sup>th</sup> International Conference on Porous Media & Annual Meeting of the International Society for Porous Media, May 9 - 12, 2016, Cincinnati, USA.
3. "Combined CFD/Pore-Network Modeling of Isothermal Drying of a Porous Medium Exposed to Turbulent Air Flow," S. Beyhaghi and K.M. Pillai, a poster presented at the minisymposium on drying, 5<sup>th</sup> International Conference on Porous Media organized by Interpore, Prague, May 21-24, 2013.
4. "Processing and Characterization of Scalable Nanocellulose Composites made Using Liquid Composite Molding," Trevor Burg, Issam I. A. Qamhia, Bamdad Barari, Tom Ellingham, Srikanth Pilla, Krishna Pillai, Rani F El Hajjar, Lih-Sheng Turng, Ronald Sabo, a poster presented at The Advancements in Fiber-Polymer Composites: Wood Fiber, Natural Fibers and Nanocellulose, a conference hosted by Forest Products Society at Milwaukee, WI, May 6-7, 2013.

5. "Study of the Closure Problem for Prediction of Tortuosity and Dispersion Tensor during Multicomponent Transport in a Consolidated Porous Medium," S. Beyhaghi and K.M. Pillai, a poster presented at 4<sup>th</sup> International Conference on Porous Media and its Applications in Science, Engineering and Industry, Potsdam (Germany), June 17-22, 2012.
6. "POREFLOW<sup>®</sup>: A Simulation Code for Liquid Infiltration/Wetting Flows in Industrial Porous Media," H. Tan and K.M. Pillai, a poster presented at 3rd International Conference on Porous Media and its Applications in Science and Engineering (ICPM3), Montecatini, Italy, June 20-25, 2010.
7. "Numerical Simulation of Wicking in Porous Media Using the Clear-Front Porous-Media Flow Model," R. Masoodi, K.M. Pillai and H. Tan, 1st International Conference on Challenges of Porous Media and the inaugural meeting of the International Society for Porous Media, Kaiserslautern, Germany, March 11-14, 2009.
8. "Developing Next-Generation Mold-Filling Simulations for LCM Processes in Polymer Composites", K.M. Pillai, *invited* poster at "CAE in Polymer Processing", Gordon Research Conference, Ventura CA, Feb 2001.
9. "Macroscopic Modeling of Void Formation in RTM", K. M. Pillai and S.G. Advani, A poster presented at Liquid Composite Molding Workshop, Columbus (OH), June 1996.

#### 4. Intellectual Property (Patents, Invention Disclosures and Copyrights)

- Copyright certification for the simulation code PORE-FLOW (registration number = TXu 1-627-147) was issued to UWM Research Foundation on Feb 23, 2009.

Comments: PORE-FLOW is used for simulating flows in industrial porous media and includes 1) wicking flows in paper and fabrics, and 2) resin flows during mold-filling in the resin transfer molding process for making polymer matrix composites. Handling dual-scale porous media is its very unique and powerful ability. The several-thousand-lines code written in fortran 95 imports the details of an FEM mesh and at the end of its run, gives out result that can be viewed using a post-processing software. See <http://www4.uwm.edu/porous/> and <http://uwmresearchfoundation.org/Files/%28OTT1179%29PORE-FLOW-NCS.aspx> for more details.

- Copyright certification for the simulation code MIMPS (registration number = TXu 1-780-958) was issued to UWM Research Foundation on Oct. 27, 2011.

Comments: MIMPS (Metal Injection Molding Process Simulation) is used for simulating liquid-metal flows during mold-filling in the pressure infiltration process for making metal-matrix composites. Its special, unique feature is the capability to

handle dual-scale porous media found in fabrics. See <http://uwmresearchfoundation.org/Files/MIMPS-Tech-Summary-1289.aspx> for more details.

## 5. Non-Refereed Publications

- Reports submitted to Companies and Institutions:
  1. “Using wicking models to design a high through-put, fully-wet wick for a piezo-electric incense dispenser,” M.A.F. Zarandi and K.M. Pillai, a technical report submitted to S C Johnson & Son Inc., Racine (WI), May 2017.
  2. “On modeling unsaturated flow of a liquid through multiple layers of thin, swelling porous media,” A. Kaffel and K.M. Pillai, a technical report submitted to Kimberly-Clark Inc., Nina (WI), May 2016.
  3. “Evaporation of Binary/Multi-Component Liquid Mixtures from Porous Polymer Wicks”, S. Beyaghi and K.M. Pillai, a technical report submitted to S.C. Johnson & Son Inc, Racine (WI), April 2010.
  4. "Wicking in pre-swelled superabsorbent particles," R. Masoodi and K.M. Pillai, a technical report submitted to Procter & Gamble Service GmbH, Germany, April 2009.
  5. "A preliminary study of wicking modeling in superabsorbent particles," R. Masoodi, R. and K.M. Pillai, a technical report submitted to Procter & Gamble Service GmbH, Germany, March 2009.
  6. "A New Model to Predict the Liquid Absorption Rate in Polymer Wicks," R. Masoodi, R. and K.M. Pillai, a technical report submitted to S.C. Johnson & Son Inc, Racine (WI), July 2007.
  7. “EZ Squeegee Process Analysis,” T. Roy and K.M. Pillai, an internal report submitted to S.C. Johnson, Inc., Racine (WI), Feb 2006.
  8. “Modeling the evaporation of volatile chemicals from passive porous systems (Phase 1),” K.M. Pillai, an internal report submitted to S.C. Johnson, Inc., Racine (WI), Sep 2004.
  9. “Simulating the flow of a shear-thinning, strain-hardening material through a conical die,” K.M. Pillai, final report to W.L. Gore & Associates, Elkton, MD, Oct 1999.
  10. “Modeling of Preform Compression during Injection/Compression Molding Process,” K.M. Pillai and C.L. Tucker, III, **Four** quarterly reports to NIST, Gaithersburg, MD, 1997-1998.

11. "On using LIMS for simulating the process of making an RTM part," K.M. Pillai and S.G. Advani, a report to British Aerospace, U.K., 1996.
12. "Study of flow, heat and mass transfer around buried nuclear waste canisters," K. Muralishar and K.M. Pillai, a report to Department of Atomic Energy, India, 1991.

## **6. Invited Lectures Presented at Universities, Industries, etc.**

- i. "Wicking and evaporation of multicomponent liquids in Wicks," talk at S.C. Johnson, Inc. , Racine (WI), June 7, 2016.
- ii. "Use of sharp interfaces in flow models to predict wetting of industrial porous media," invited talk during visit to IIT BHU (Varanasi), DRDO (Pune) and CSIR Lab (Trivandrum) in India during the summer of 2015.
- iii. "Use of sharp interfaces in flow models to predict wetting of industrial porous media," talk at the Center for Composite Materials at U. of Delaware on 8-14-2015.
- iv. "Two-Phase Flow in Porous Media," talk at S.C. Johnson, Inc. , Racine (WI), Oct 16, 2014.
- v. "Evaporation of a Non-Dilute Multi-Component Liquid Mixture from a Porous Wick," a talk presented at Bowman Gray R&D Center, R.J. Reynolds Tobacco Co., Salem, North Carolina, July 16, 2013.
- vi. "Modeling Slow Evaporation of Liquids in Porous Media using Network Model," a talk presented at Mechanical Engineering Department of Lulea University, Lulea, Sweden, under the invitation of Prof. Staffan Lundstrom, March 21, 2013.
- vii. "Coupling Mass Transfer in Inner and Outer Flows while Modeling Drying from a Pore-Network Model," a talk presented at I.M.F.T. (Institut de Mecanique des Fluides de Toulouse), Toulouse, France, under the invitation of Prof. Michel Quintard, June, 2012.
- viii. "Experimental and Theoretical Validation of Permeability obtained using the Closure Formulation for Sintered Polymer Wicks," a talk presented at I.M.F.T. (Institut de Mecanique des Fluides de Toulouse), Toulouse, France, under the invitation of Prof. Michel Quintard , June, 2012.
- ix. "Use of sharp interfaces in flow models to predict wetting of industrial porous media," a talk presented at Georgia-Tech under the invitation of Prof. Haskell Beckham, Aug 29, 2011.

- x. “Using RTM to make CNF composites,” a talk presented at USDA Forest Products Lab, Madison, WI, Aug 17, 2011.
- xi. “Simulating the Wetting of Dual-Scale Porous Media encountered in Liquid Composites Molding during the Manufacture of Polymer Composites,” a talk presented at Ecole Polytechnique at University of Montreal under the invitation of Prof. Francois Trochu, May 30, 2011.
- xii. “Modeling Bubble Creation and Migration during Unsaturated Flow,” a talk presented at Ecole Polytechnique at University of Montreal, under the invitation of Prof. Francois Trochu, May 31, 2011.
- xiii. “A History of SCJ-UWM Collaborations and the way forward,” a talk presented at SC Johnson & Son, Inc., Dec 10, 2010.
- xiv. “PORE-FLOW: a code for simulating flow and transport in industrial porous media,” a talk presented at the UWM-Industry Consortium meeting, Jan 21, 2010.
- xv. A series of talks on composites processing by Dr. Pillai’s research group at USDA Forest Products Lab, Madison, WI, Jan 4, 2010.
- xvi. A series of *invited* talks on permeability measurement and wicking by Dr. Pillai, Proctor & Gamble, Germany, May, 2009.
- xvii. A series of talks on composites processing by Dr. Pillai’s research group at USDA Forest Products Lab, Madison, WI, April 30, 2009.
- xviii. “Modeling Evaporation of Liquids in Porous Substrates,” a talk presented at SC Johnson & Son, Inc., Nov 18, 2008.
- xix. “Hybrid Micro-Nano Composites,” A talk at MiniTec Symposium in Milwaukee organized by Society of Plastics Engineers, Oct, 2008.
- xx. “Interfacial Boundary Conditions at the Clear-Fluid / Porous Medium Interface,” a talk at the Mechanical Engineering Department of Wuhan University, China in the summer of 2008.
- xxi. “Modeling Unsaturated Flow in Fibrous Porous Media used as Reinforcement in Polymer Composites,” a talk at the Mechanical Engineering Department of Wuhan University, China in the summer of 2008.
- xxii. “Deviation from Darcy’s law: an implication of unsaturated flow in dual-scale fiber mats in LCM,” a talk at the Mechanical Engineering Department of Wuhan University, China in the summer of 2008.
- xxiii. “Some studies on modeling the unsaturated flow in woven, stitched or braided fiber mats in LCM,” a talk at National Physical Laboratory (New Delhi, India), Jan 2007.

- xxiv. “Some studies on modeling the unsaturated flow in woven, stitched or braided fiber mats in LCM,” Mechanical Engineering Department, I.I.T. Delhi (New Delhi, India), Jan 2007.
- xxv. Invited to present a talk on plastics research at UWM at the at the local chapter meeting of SPE (Society of Plastics Industry), Feb 2006.
- xxvi. Presented a talk on the mold-filling simulations for plastics industry at the local chapter meeting of SPE (Society of Plastics Industry), April 16, 2002.
- xxvii. Presented a talk on the topic of uses of CFD in industry at SC Johnson & Son, Inc., at Racine in the spring of 2002.
- xxviii. “Modeling Unsaturated Flow in a Dual Scale Porous Medium,” a talk presented at the Mechanical Engineering Department of I.I.T. Kanpur (Kanpur, India), Jan 4, 2001.
- xxix. “Modeling Unsaturated Flow in a Dual Scale Porous Medium,” a talk presented at the Center for Polymer Science and Engineering, I.I.T. Delhi (New Delhi, India), Jan 9, 2001.
- xxx. “R&D of Polymers and Composites at UWM,” a talk presented at the Regional Research Laboratory (CSIR), Thiruvanthapuram (Kerala, India), Jan 15, 2001.

## **B. Grants, contracts, and awards**

- 1) SURF (Summer Undergraduate Research Fellowship) awards given by UWM Graduate School for one undergraduate student (Liam Michael Brodie) in Jan 2020 for the spring of year 2020, grant amount = \$1,500.
- 2) Educational grant provided by the Milwaukee chapter of SPE (Society of Plastics Engineers) in Oct 17, 2017 for work to be done in the spring semester of 2018. Grant amount = \$2,400.
- 3) SURF (Summer Undergraduate Research Fellowship) awards given by CEAS (College for Engineering and Applied Science) for two undergraduate students (Salvador Arroyo and Tanya Schilling) in Sep 2017 for the fall-spring semesters of 2017, grant amount = \$6,000.
- 4) McNair Scholarship awarded to Salvador Arroyo, an undergraduate student of K.M. Pillai, in the summer of 2017, grant amount = \$4000 approx.
- 5) *“Using wicking models to design a high through-put, fully wet wick for a piezo-electric incense dispenser,”* K.M. Pillai (Principal Investigator or PI); grant name = research project sponsored by a company; agency = S.C. Johnson & Son, Inc.,

- Racine, WI; granting period = Sep15, 2016 to March 14, 2017; grant amount = \$13,536.
- 6) SURF (Summer Undergraduate Research Fellowship) award given by CEAS (College for Engineering and Applied Science) for one undergraduate student (Salvador Arroyo) in fall 2016, \$4,800.
  - 7) *“Developing a Fast Absorbency Simulation”*, K.M. Pillai (PI); grant name = research project sponsored by a company; agency = Kimberly-Clark, Inc., Neenah, WI; granting period = 2/1/2015-1/31/2017; grant amount = \$243,690.
  - 8) *“Porous Media Lab Fund”*, K.M. Pillai (recipient), UWM Foundation, Donor = Kimberly-Clark Corporation, Neenah, WI; gift account = \$25,000.
  - 9) *“Wick Performance Modeling”*, K.M. Pillai (PI); grant name = research project sponsored by a company; agency = Lamplight farms, Inc., Menomonee Falls, WI; grant number = 133-PRJ78RF; granting period = 1/1/2014-12/31/2014; grant amount = \$52,154.
  - 10) *“Scaffolding and Forming Methods for Scalability of Thermosetting Nanocellulose Composites”*; Rani El-Hajjar (PI) and K.M. Pillai (Co-PI); grant name = Research Growth Initiative (RGI) award; agency = UWM Graduate School; granting period = 9/2013-12/2014; grant amount = \$125,235.
  - 11) *“Making Scalable Green Composites made from Cellulose Nano Fibers”*; K.M. Pillai (PI) and Rani El-Hajjar (Co-PI); grant name = UW-Milwaukee/UW-Madison Intercampus Research Incentive Grant; agency = UW Milwaukee and UW-Madison; granting period = 7/1/2012-7/31/2013; grant amount = \$37,468.
  - 12) *“Simulating the Making of Dual-Scale Metal-Matrix Composites using the Pressure Infiltration Process”*; K.M. Pillai (PI) and P. Rohatgi (Co-PI); grant name = Research Growth Initiative (RGI) award; agency = UWM Graduate School; granting period = 7/1/2010-5/31/2013; grant amount = \$103,584.
  - 13) SURF (Summer Undergraduate Research Fellowship) award given by CEAS (College for Engineering and Applied Science) for two undergraduate students, 2012-2013, \$4,000.
  - 14) *“Nanocellulose Composites using Resin Transfer Molding”*, Rani El-Hajjar (PI) and K.M. Pillai (Co-PI); agency = USDA Forest Product Laboratory (Madison, WI); granting period = 9/2011-8/2012; grant amount = \$50,000.
  - 15) SURF (Summer Undergraduate Research Fellowship) award given by CEAS (College for Engineering and Applied Science) for two undergraduate students, 2011-2012, \$4,000.



- 16) Summer SURF (Summer Undergraduate Research Fellowship) award given by CEAS (College for Engineering and Applied Science) for three undergraduate students, summer of 2011, \$5,440.
- 17) “*Simulating the Making of Dual-Scale Metal-Matrix Composites using the Pressure Infiltration Process*”; K.M. Pillai (PI) and P. Rohatgi (Co-PI); grant name = Catalyst Grant; agency = UWM Research Foundation; granting period = 1/31/10-8/31/11; grant amount = \$60,000.
- 18) “*Developing Processing Science for Natural Fiber Composites*”; K.M. Pillai (PI); grant name = seed money by UWM Graduate School; agency = UWM Graduate School and College of Engineering & Applied Science; granting period = 7/1/2010-10/30/2011; grant amount = \$42,480.
- 19) “*Modeling Evaporation and Transport of Multi-Component Liquids in Wicks*”; K.M. Pillai (PI); grant name = research project sponsored by a company; agency = S.C. Johnson & Son, Inc., Racine, WI; granting period = 2/1/2009-1/31/2010; grant amount = \$56,299.
- 20) “*Studying Wicking in Superabsorbent Polymer Beads*”; K.M. Pillai (PI); grant name = exploratory consultancy study sponsored by a multinational company; agency = Proctor & Gamble, Inc.; granting period = Jan-April, 2009; grant amount = \$3,100.
- 21) “*Investigating the use of Rapid Prototyping methods to create a calibration tool for 1D Flow device used for measuring permeability of fiber mats*”; K.M. Pillai (PI); grant name = Research Experience for Undergraduates (REU); agency = NSF; granting period = 9/19/2008-5/31/2011, grant amount = \$5,305.
- 22) “*Investigating the use of rapid prototyping methods to create a calibration tool for 1D and radial flow devices used for measuring permeability of fiber mats*”, K.M. Pillai (PI) ; grant name = SUGAR (Stipend for Undergraduate Research Assistant) award; agency = CEAS (College for Engineering and Applied Science); granting period = 2/2008-2/2009; \$5,400.
- 23) “*Modeling Evaporation of Liquids using Network Models*”; K.M. Pillai (PI); grant name = Research during Sabbatical Leave at IMFT (Institut de Mecanique des Fluides), Toulous, France; agency = CNRS (Centre National de la Recherche Scientifique), France; granting period = Sep 2007 to May 2008 (6 months); grant amount = € 22,338.
- 24) Grant to build experimental setup for wiping studies; S.C. Johnson & Son, Inc., Racine, WI; amount: \$7,000; 2007-2008.

- 25) *“Modeling the Evaporation of Volatile Liquids from Porous Media”*, K.M. Pillai (PI); grant name = research project sponsored by a company; agency = S.C. Johnson & Son, Inc., Racine, WI; granting period = 6/2007-6/2008; grant amount = \$35,674.
- 26) *“Wiping a Dirty Surface Clean”*; K.M. Pillai (PI); grant name = NA; agency = UWM Foundation (MyTAG program); grant number = NA; granting period = July 1, 2007 to Dec 31, 2008; grant amount = \$25,000.
- 27) *“Understanding and Modeling the Phenomenon of Wiping a Surface”*, K.M. Pillai (PI); grant name = research project sponsored by a company; agency = S.C. Johnson & Son, Inc., Racine, WI; granting period = 6/1/2006-5/31/2007; grant amount = \$35,050.
- 28) 1 course buy-out funded by S.C. Johnson & Son, Inc., in Spring 2006 for amount = \$12,250 to work on the literature review of the topic “Modeling the Evaporation of Multi-component Liquids from a Porous Substrate under Non-Isothermal Conditions”.
- 29) “Investigating Unsaturated Flow in Dual-Scale Porous Media”; K.M. Pillai (PI); grant name = Research Experience for Undergraduates (REU); agency = NSF; grant number = 144-MQ75; granting period = 2/1/2006-1/31/2007, grant amount = \$6,000.
- 30) *“CAREER: Modeling the Unsaturated Flow During Fiber Wetting in the Manufacture of Composite Materials”*, K.M. Pillai (PI); grant name = CAREER grant; agency = National Science Foundation (NSF); granting period = 6/1/2004-5/31/2011; grant amount = \$431,662.
- 31) “Investigating Unsaturated Flow in Dual-Scale Porous Media”; K.M. Pillai (PI); grant name = Research Experience for Undergraduates (REU); agency = NSF; granting period = 9/1/2004-8/31/2005, grant amount = \$10,000.
- 32) *“Optimizing the Manufacture of Plastics using Computer Simulations”*; K.M. Pillai (PI); grant name = Applied Research Award; agency = UW System; granting period = 7/1/2000-6/30/2001; grant amount = \$42,615.
- 33) Army Research Lab, Aberdeen, MD, 1999, \$10,000, Co-PI  
Title: Flow Modeling the Encapsulation Process used in the Manufacture of Artillery Field Coil

## EDUCATIONAL ACHIEVEMENTS

### Experience as a Teacher

1. Courses taught

- ME 707 (Transport in Porous Media\*); graduate course
- ME 706 (Continuum Mechanics\*); graduate course
- ME 711 (Conduction & Radiation); graduate course
- ME 890 (Advanced Topics: Flow of Materials\*); graduate course
- ME 455 (Processing of Plastics\*); undergraduate/graduate course
- ME 420 (Intermediate Fluid Mechanics\*); undergraduate/graduate course
- ME 411 (Intermediate Heat Transfer\*); undergraduate/graduate course
- ME 438 (Mechanical Engineering Experimentation); undergraduate course
- ME 321 (Basic Heat Transfer); undergraduate course
- ME 320 (Fluid Mechanics); undergraduate course
- ME 301 (Thermodynamics); undergraduate course
- ME 394 (Design Projects); undergraduate course

\* = New course introduced by Prof. Pillai

2. Graduate and undergraduate research projects, theses and dissertations directed

**PhD Theses:**

1. Amin Zarandi, Ph.D., Dissertation Title: “Experimental, Theoretical, and Numerical Evaluation of Wicking Models for Liquid Imbibition in Dry Porous Wicks,” Dec 2019.
2. Bamdad Barari, Ph.D., Dissertation Title: “Experimental and Numerical Characterization of Scalable Cellulose Nano-Fiber Composite,” May 2016.
3. Zhenyu Xu, Ph.D., Dissertation Title: “Numerical Simulation of Slow Drying in Porous Media using Pore Network Model,” May 2016.
4. Alexander Reikheri, Ph.D., Dissertation Title: “Numerical Analysis of Die-Casting Process in Thin Cavities using Lubrication Approximation,” Dec 2012.
5. Ehsan Langoori, Ph.D., Dissertation Title: “Modeling Isothermal and Non-Isothermal Flows in Porous Media,” Jan 2011.
6. Hua Tan, Ph.D., Dissertation Title: “Simulation of Flow in Dual-Scale Porous Media”, May 2010.
7. Reza Masoodi, Ph.D., Dissertation Title: “Modeling Imbibition of Liquids into Rigid and Swelling Porous Media”, May 2010.

8. Murthy Munagavalasa, Ph.D., Dissertation Title: “Theoretical Modeling of Unsaturated Flow in Fibrous Dual-Scale Porous Media using the Volume Averaging Method”, Dec 2006.
9. Tonmoy Roy, Ph.D., Dissertation Title: “Modeling Unsaturated Flow in Dual-Scale Porous Media”, May 2006.

**MS Theses:**

1. Reihaneh Etemadi, M.S., Dissertation Title: “Effects of Processing Parameters and Matrix Shrinkage on Porosity Formation during Synthesis of Metal Matrix Composites with Dual-Scale Fiber Reinforcements using Pressure Infiltration Process,” May 2014.
2. Mohammad Reza Shaeri, M.S., Dissertation Title: “Investigating Regular Pore Network Models to Predict Drying in Porous Media”, Jan 2012.
3. Saman Beyaghi, M.S., Dissertation Title: “Evaporation of Non-Dilute, Multi-Component Liquid Mixture from Porous Polymer Wicks”, August 2010.
4. Choakchai J. Pakdeethai, M.S., Dissertation Title: “Synthesis, Characterization and Flow Properties of Epoxy/Clay Nanocomposites”, Aug 2006.
5. Rajendra Jadhav, M.S., Dissertation Title: “A Numerical Study of Non-Isothermal Reactive Flow in Dual Scale Porous Media”, Dec 2003.
6. Baiju Zacharia Babu, M.S., Dissertation Title: “The Effect of Fiber-Mat Compression and Architecture on the Unsaturated Flow in Liquid Composite Molding – An Experimental Study”, Sep 2002

**Supervising Post-Docs and Visiting Faculty:**

1. Dr. Ahmed Kaffel, Post-Doctoral Fellow, Feb 2016 to Jan 2018.
2. Prof. Pradyumna Ghosh, PhD, Visiting Professor, June 2 to June 22, 2016.
3. Dr. Yong Liu, Visiting Associate Scientist, Aug 1, 2015 to Aug 20, 2016.
4. Dr. Wang Bo, Post-Doctoral Fellow, Sep 27, 2010 to Sep 26, 2011.
5. Dr. Reza Masoodi, Post-Doctoral Fellow, July 2010 to July 2011.

**Serving in Thesis Defense Committees:**

### Outside USA

- *Invited* to be the thesis committee of Mr. Shubham Jaiswal at I.I.T.-B.H.U., Varanasi, India, spring semester, 2018. Thesis title: “Study of Some Transport Phenomena Problems in Porous Media”
- *Invited* to be the thesis examiner in the Ph.D. thesis defense of Mr. Amir Jourak at Lulea University of Technology, Sweden, spring of 2013. Thesis title: “Modeling Flow and Solute Transport in Packed Beds”
- *Invited* to be in the PhD thesis committee of Mr. D. Raja at Anna University, Chennai, India, Nov 2012. Thesis title: “Design and Development of Transverse wicking device and analysis of dynamic liquid transfer behavior of fabrics”
- *Nominated* to be in the PhD thesis committee of Mr. Arash Ejlali at School of Mechanical and Mining Engineering, The University of Queensland, Australia, March 2012.

### At UW-Milwaukee

- A member of PhD defense committee of Azam Nabizadehdarabi, a student of Prof. Tabatabai of Civil & Environmental Engineering, 2019.
- A member of PhD thesis defense committee of Ali Bakshinejad, a student of Prof. Roshan D’ Souza of Mechanical Engineering Department, 2018.
- A member of MS thesis defense committee of Swetashwa Suri, a student of Prof. Nathan Salowitz of Mechanical Engineering Department, 2016.
- A member of PhD thesis defense committee of Rahul Ramachandran, a student of Prof. Michael Nosonovsky of Mechanical Engineering Department, 2016.
- A member of committee of Steve Schroeder (MS – non-thesis option) of ME, 2014.
- A member of MS thesis defense committee of Manasa Nayani, a student of Prof. Nidal Abu-Zahra of Materials Science & Engineering Department, 2010.
- A member of PhD thesis defense committee of Srikanth Pilla, a student of Prof. Sarah Gong of Mechanical Engineering Department, 2008.
- A member of PhD thesis defense committee of Ali Alian, a student of Mechanical Engineering Department guided by Prof. Nidal Abu-Zahra, spring 2008.

- A member of MS thesis defense committee of Michael Hemmingsen, a student of Prof. Hector Bravo of Civil Engg. Dept., 2006
- A member of MS thesis defense committee of Mr. Vindhya Tiwari, a student of Prof. Pradeep Rohatgi of Materials Science Department, 2004.
- A member of PhD thesis defense committee of Dr. Rami A. Hawileh, a student of Prof. Adeb Rahman of Civil Engineering department, 2003.

### **Supervising Undergraduate students:**

Following students worked in Dr. Pillai's *Laboratory for Flow and Transport Studies in Porous Media* and were supported with scholarships as well as research grants from National Science Foundation, companies and the university:

- 1) David Bogdan
- 2) Charity Dulmes
- 3) Tom Kalina
- 4) Scott Winkelman
- 5) Derek Forehand
- 6) Andrew Vechart
- 7) Michael Verhagen
- 8) Russel D. Moore
- 9) Grover L. Bennett
- 10) Robert Bellin
- 11) Thomas Duelge
- 12) John Puentes Gil
- 13) Samuel Alberts
- 14) Hassan Al-Yagoub
- 15) James Kocan
- 16) Abdolreza Javadi
- 17) Nick Grahl
- 18) David Fabian
- 19) Trevor Burg
- 20) Mitchell Merz
- 21) Tanya Schilling
- 22) Salvador Arroyo
- 23) Liam Michael Brodie

### **Student Posters within the university**

1. "Determination of Permeability of Engineering Textiles," Salvador Arroyo and K.M. Pillai, CEAS poster exhibition and competition, University of Wisconsin-Milwaukee, 2017.

2. "Next-Generation Model for Spontaneous Wicking of Liquid in Partially Saturated Glass Fiber Wicks," M.A.F. Zarandi and K.M. Pillai, CEAS poster exhibition and competition, University of Wisconsin-Milwaukee, 2017.
3. "Determination of Permeability of Engineering Textiles," Salvador Arroyo and K.M. Pillai, CEAS poster exhibition and competition, University of Wisconsin-Milwaukee, 2017.
4. "Search for a 'Green' Composite Material: An Attempt to Fabricate Cellulose Nano-Fiber Composites," B. Barari and K.M. Pillai, CEAS poster exhibition and competition, University of Wisconsin-Milwaukee, 2016.
5. "Modeling Spontaneous Wicking of Liquid in Partially Saturated Glass Fiber Wicks," M.A.F. Zarandi and K.M. Pillai, CEAS poster exhibition and competition, University of Wisconsin-Milwaukee, 2016.
6. "Pressure Infiltration Process for Synthesis of Graphene Reinforced Nano-Metal Matrix Composites," R. Etemadi, K.M. Pillai and P. Rohatgi, CEAS poster exhibition and competition, University of Wisconsin-Milwaukee, 2016.
7. "Creating Cellulose Nano-Fiber Composites using LCM Process," T. Burg and K.M. Pillai, CEAS poster exhibition and competition, University of Wisconsin-Milwaukee, 2013.
8. "Swelling Behavior of Jute Fibers in Epoxy and Biobased Epoxy Resins," N. Grahl, R. Masoodi, R. and K.M. Pillai, CEAS poster exhibition and competition, University of Wisconsin-Milwaukee, 2011.
9. "Study of Moisture Absorption and Swelling in Bio-Based Green Composites," B. Weibel, R. Masoodi and K.M. Pillai, CEAS poster exhibition and competition, University of Wisconsin-Milwaukee, 2011.
10. "Swelling of Cellulose Nano-Fibers (CNFs) in Epoxy, Bio-Based Epoxy, and Water," Javadi, A., Masoodi, R. and, Pillai, K.M., CEAS poster exhibition and competition, University of Wisconsin-Milwaukee, 2011.

11. “Calibration of 1-D and Radial Flow Permeability Estimation Experiments using a Stereolithographic Idealized Porous-Medium using CFD,” A. Vechart and K.M. Pillai, CEAS poster exhibition and competition, University of Wisconsin-Milwaukee, 2010.

### 3. **Grants for teaching**

Several small grants were obtained from Milwaukee based plastics companies and the local chapter of Society of Plastics Engineers (SPE) for research, service and education. For example,

- A grant of \$2000 was procured from the Milwaukee chapter of SPE (Society of Plastics Engineers) for buying 2004 site license for Moldflow, a plastics design software.
- Arranged for a \$250 grant from the local chapter of SPE for the purchase of educational videos for Processing of Plastics in 2001.

## SERVICE WORK FOR THE PROFESSION

### Teaching Technical Courses

- “Volume Averaging Method for Upscaling in Porous Media”: This two-week course was funded by the Global Initiative of Academic Networks (GIAN) initiative of Government of India and was conducted from 5-16 January, 2016 at IIT-BHU, Varanasi in India. This course was conducted in collaboration with Prof. Pradyumna Ghosh of IIT-BHU.

Videos and student feedback for this course is available at <http://people.uwm.edu/porousmedia/courses-videos/volume-averaging-method-for-upscaling-in-porous-media/>

- “Upscaling in Porous Media using the Volume Averaging Method”: This six-hour course was delivered on May 13, 2016 at the 8<sup>th</sup> International Conference on Porous Media and Annual Meeting of the International Society for Porous Media (INTERPORE 2016). The course was conducted in collaboration with Prof. Michel Quintard of France, an internationally-known authority on the volume averaging method.

### Editing and Reviewing

- Associate Editor for *Special Topics and Reviews in Porous Media* since 2019.



- Associate Editor for *Journal of Porous Media* since July, 2018.
- Member of the Editorial Board for *Composite Part A: Applied Science and Manufacturing* since Jan, 2013.
- Co-Editor of a special issue on thin porous media of *Transport in Porous Media*, vol. 115, issue 3, Dec 2016.
- Member of the Editorial Board for *Open Journal of Heat, Mass and Momentum Transfer* since April, 2013 till its closure in 2015.
- Member of the editorial and review board of *Caste Metal Matrix Composites in the Next Millennium*, proceedings of a symposium sponsored by ASM International at TMS Fall Meeting at St. Louis, Missouri

Refereeing of journal articles, books, grant proposals, etc.

- Reviewing articles as a member of the Editorial Board for *Composite Part A: Applied Science and Manufacturing* since January, 2013.
- Reviewed numerous manuscripts for *Physics of Fluids, Computers & Fluids, Journal of Porous Media, International Journal of Multiphase Flows, Journal of Composite Materials, Composites Science & Technology, Polymer Composites, Numerical Heat Transfer, Journal of Heat Transfer, The Journal of the Textile Institute*, and *Journal for Colloid and Interface Science*
- Participated in panel reviews to evaluate the proposals submitted to the National Science Foundation, USA.
- Reviewed research grant proposals for other funding agencies including the national science foundation of Switzerland, Petroleum Research Fund, and University Technology Development Fund of University of Maryland.
- As a member of the scientific committee for FPCM (Flow Processes in Composite Material) conferences since 2010, reviewed manuscripts submitted for publication in conference proceedings.
- Reviewed papers submitted for ASME (Americal Society for Mechanical Engineers) conferences.
- Reviewed papers on Liquid Composite Molding for ICCM-19 conference, Montreal, Canada, Aug 2013.

Review of Tenure Applications of Faculty

- Conducted review of application for promotion from Assistant Professor to Associate Professor of Dr. Hooman Tafreshi (Virginia Commonwealth University) in 2011.
- Conducted review of application for promotion from Assistant Professor to Associate Professor of Dr. Murat Sozer (Koc University, Turkey) in 2009.

#### Participation in professional organizations and conferences

- Chaired a technical session in *A National conference on Critical heat flux and Multi-phase flow jointly organized by IIT BHU and IIT Bombay, venue IIT BHU, coordinator Prof. Pradyumna Ghosh (Mech. Engg.), 21<sup>st</sup> Dec, 2018.*
- Chaired a technical session in FPCM14 (14<sup>th</sup> International Conference on Flow Processes in Composite Materials) held at Lulea, Sweden, May 29-June 1, 2018.
- Organized and chaired a **mini-symposium** of three talks on wicking (M. 14) at 10<sup>th</sup> International Conference on Porous Media at New Orleans (USA), organized by INTERPORE, the International Society for Porous Media, May 14-17, 2018.
- Mentor for the opening of India chapter of Interpore in Dec, 2017.
- Member of the Membership Committee of INTERPORE since 2016.
- Member of the Membership Committee of the local University of Wisconsin-Milwaukee chapter of AAUP (American Association of University Professor) since 2016.
- **Chair** of the local organizing committee (LOC) for 6<sup>th</sup> International Conference on Porous Media at Milwaukee organized by INTERPORE, the International Society for Porous Media, May, 2014.
- Member of the program committee for 6<sup>th</sup> International Conference on Porous Media at Milwaukee organized by INTERPORE, the International Society for Porous Media, May, 2014.

- Member of the program committee for 5<sup>th</sup> International Conference on Porous Media at Prague organized by INTERPORE, the International Society for Porous Media, May, 2013.
- Organized and chaired a **mini-symposium** of four talks on processing of composite materials at 5<sup>th</sup> International Conference on Porous Media at Prague organized by INTERPORE, the International Society for Porous Media, May, 2013.
- Chaired a session on heat transfer and phase change in porous media at 4<sup>th</sup> International Conference on Porous Media at Purdue University organized by INTERPORE, the International Society for Porous Media, May, 2012.
- Chaired a technical session in FPCM11 (11<sup>th</sup> International Conference on Flow Processes in Composite Materials) held at Auckland, New Zealand in July of 2012.
- Chaired a technical session in FPCM10 (10<sup>th</sup> International Conference on Flow Processes in Composite Materials) held at Monte Verita, Switzerland in July of 2010
- Co-chaired two technical sessions in FPCM9 (9<sup>th</sup> International Conference on Flow Processes in Composite Materials) held at Montreal, Canada in July of 2008
- Co-chaired a technical session in FPCM8 (8<sup>th</sup> International Conference on Flow Processes in Composite Materials) held at Duoi, France in July of 2006
- Co-chaired the session ‘Thermoplastic Processing’, 7<sup>th</sup> International Conference on Flow Processes (FPCM 7), Newark, DE, July7-9, 2004.

#### CONSULTING ACTIVITIES

- Consultant for Nerudia in the summer of 2018.
- Consultant for S.C. Johnson & Son, Inc. (Racine, WI) in the summer of 2017.
- Consultant for S.C. Johnson & Son, Inc. (Racine, WI) in the summer of 2016.
- Consultant for R.J. Reynolds Tobacco Co. (Salem, North Carolina) in the summer of 2013.
- Consultant for Proctor & Gamble, Inc. (Germany) in the summer of 2008.
- Consultant for S.C. Johnson & Son, Inc. (Racine, WI) in the summer of 2004.

#### SERVICE WORK FOR UWM

- Elected chairperson for Graduate Program Committee in ME Dept. since fall, 2019
- Current member of ME Executive Committee
- Current member of ME department committee
- Previous Service Work:
  - ex-member of Affirmative Action in Faculty Employment Committee
  - ex-member of Faculty Senate
  - ex-member of Committee for Review of Administrators
  - ex-chairman of ME Graduate Program Committee
  - ex-member of CEAS nominations committee
  - ex-member of CEAS GPSC committee
  - etc.