ATTACHMENT NO. 1

CV – DR. JOHN ABRAHAM

SUMMARY

Thermal science expert with experience in all aspects of heat transfer and fluid mechanics. Produced approximately 450 publications, books, book chapters, conference presentations, and patents in areas including biological heat transfer and fluid flow, biomedical device design, energy, burn injuries, climate change, fundamental heat transfer and fluid mechanics, and manufacturing processes. Author of approximately 350 popular press articles and has been in approximately 200 radio and television appearances.

APPOINTMENTS

University of St. Thomas, St Paul, MN

Professor	**2013-Present**
Associate Professor	**2008-2013**
Assistant Professor	**2002-2008**

EDUCATION

University of Minnesota - Twin Cities, Minneapolis, MN

Ph.D., Mechanical Engineering (Thermal Sciences)	**2002**
M.S., Mechanical Engineering, GPA 3.96/4.00	**1999**
B.S., Mechanical Engineering, GPA 4.00/4.00, **Minor**: Mathematics	**1997**

PREVIOUS TEACHING EXPERIENCE

Adjunct Faculty, *University of St. Thomas, St Paul, MN*	**2000-2002**
Graduate Teaching Fellow, *University of Minnesota, Minneapolis, MN*	**2001-2002**
Teaching Assistant, *University of Minnesota, Minneapolis, MN*	**1997-2001**
Tutor, *University of Minnesota, Minneapolis, MN*	**1993-1997**

HONORS/AWARDS

- Editor's Choice Award, Journal of Forensic Sciences, (2022).
- AAS Esteemed News and Views Paper Prize, (2022)
- Journal of Atmospheric and Oceanic Technology, Editor award (2020)
- National Center for Science Education, Friend of the Planet Award (2016)
- University of St. Thomas, Professor of the Year (2016)
- USA Green Deal of the Year business excellence award (2013)
- Composites Sustainability Award, American Composites Manufacturers Association Award for Composite Excellence, (2013)
- Nominated, George Mason University, Center for Climate Change Communication, Climate Change Communicator of the Year (2011)
- University of St. Thomas, John Ireland Award (2009)
- University of St. Thomas, Distinguished Educator Award (2008)
- University of St. Thomas, Engineering Professor of the Year (2005)
- Graduate Teaching Fellowship (2001/2002)
- Institute of Technology Teaching Assistant of the Year, awarded by Institute of Technology Student Board, University of Minnesota (1999/2000)
- Institute of Technology Teaching Assistant of the Year, awarded by Institute of Technology Student Board, University of Minnesota (2000/2001)

- Institute of Technology Teaching Assistant of the Year, awarded by Institute of Technology Student Board, University of Minnesota (2001/2002)
- Mechanical Engineering Teaching Assistant of the Year, Mechanical Engineering Department, University of Minnesota (1998/1999)
- Minnesota Professional Engineers Foundation Orion Buan Memorial Scholarship (1996)
- Walter and Margaret Pierce Endowment Fund Scholarship (1996)
- National Space Grant Consortium Scholarship (1996)
- Frank Louk Scholarship (1996)
- Citizens' Scholarship (1992-1995)
- Alfred O. Neir Scholarship (1994)
- Dean's List (1993-1997)

OTHER POSITIONS

Climate Blogger – Guardian Newspaper **2013-2022**

PUBLICATIONS

(21 edited works, 3 books, 37 book chapters, 272 journal publications, 147 presentations,16 granted patents, 5 patent applications, 2 granted trademarks)

TOP PUBLICATIONS BY ALTMETRIC

L. Cheng, J.P. Abraham, K.E. Trenberth, J.T. Fasullo, T. Boyer, M.E. Mann, J. Zhu, F. Wang, R. Locarnini, Y. Li, B. Zhang, F. Yu, L. Wan, X. Chen, X. Song, Y. Liu, F. Reseghettic, S. Simoncelli, V. Gouretski, G. Chen, A. Mishonoc, J. Reagan, and G. Li, Another Year of Record Heat for the Oceans, *Advances in Atmospheric Sciences*, (in press). **Altmetric score = 1438, top 1% in all journals, January 2023. This altmetric score places the paper in the top 1% (top 100 out of 214000 papers) in all journals, and within the top 1% of papers in the publishing journal.**

L. Cheng, J.P. Abraham, K.E. Trenberth, J. Fasullo, T. Boyer, M.E. Mann, J. Zhu, F. Wang, R. Locarnini, Y. Li, B. Zhang, Z. Tan, F. Yu, L. Wan, X. Chen, X. Song, Y. Liu, F. Reseghetti, S. Simoncelli, V. Gouretski, G. Chen, A. Mishonov, J. Reagan, Another Record Ocean Warming Continues Through 2021 Despite La Nina Conditions, *Advances in Atmospheric Sciences,* Vol. 39, 373-385, 2022). **Altmetric score = 4686, top 1% in all journals, January 2022. This altmetric score places the paper in the top 0.02% (top 57 out of 287000 papers) in all journals, and within the top 1% of papers in the publishing journal.**

L. Cheng, J.P. Abrahm, K.E. Trenberth, J.T. Fasullo, T.L. Boyer, R. Locarnini, B. Zhang, F. Yu, L. Wan, X. Chen, X. Song, Y. Liu, M.E. Mann, F. Reserghetti, S. Simoncelli, V. Gouretski, G. Chen, and J. Zhu, Upper Ocean Temperatures Hit Record High in 2020, *Advances in Atmsopheric Sciences,* Vol. 38, pp. 523-530, 2021. **Altmetric score = 1439, top 1% in all journals, August 2021.**

G. Li, L. Cheng, J. Zhu, K.E. Trenberth, M.E. Mann and J.P. Abraham, Increasing Ocean Stratification Over the Past Half Century, *Nature Climate Change,* Vol. 10, pp. 1116-1123, 2020. **Altmetric score = 726, top 1%, July 2021.**

J.P. Abraham, B. D. Plourde, and L. Cheng, Using Heat to Kill SARS-CoV-2, *Reviews in Medical Virology*, Vol. 30, e2115, 2020. **Altmetric score = 392, top 1%, July, 2021.**

L. Cheng, J.P. Abraham, J. Zhu, K.E. Trenberth, J. Fasullo, T. Boyer, R. Locarnini, B. Zhang, F. Yu, L. Wan, X. Chen, X. Song, Y. Liu, and M.E. Mann, Record-Setting Ocean Warmth Continued in 2019, *Advances in Atmospheric Sciences*, Vol. 37, 1-6, 2020. **This paper was in the top 100 of all published**

scientific papers in the year 2020, ranked by Altmetric. Also, second of all 2020 papers in the subject area of climate. Altmetric score = 3957, top 1%, January 2021.

L. Cheng, J. Zhu, J.P. Abraham, K. E. Trenberth, J. T. Fasullo, B. Zhang, F. Yu, L. Wan, Z. Chen, X. Song, 2018 Continues record global warming, *Advances in Atmospheric Sciences*, 36, pp. 249-252, 2019. **Altmetric score = 646, top 1%, January 2021.**

L. Cheng, J.P. Abraham, Z. Hausfather, and K.E. Trenberth, How fast are the oceans warming?, *Science*, Vol. 363, pp. 128-129, 2019. **Altmetric score = 2853, top 1%, January 2021.**

L.J. Cheng, K.E. Trenberth, T. Boyer, J. T. Fasullo, L. Zhu, J.P. Abraham, Improved Estimates of Ocean Heat Content from 1960-2015, *Science Advances*, Vol. 4, paper no. e1601545, 2017. **Altmetric Score = 753, top 1%, January 2021.**

Editing Activities (21 editorial activities)

1. Editor, Special edition in Numerical Heat Transfer B – AI methods in heat transfer (2023)
2. Editor, Advances in Heat Transfer, Vol. 56, (forthcoming, 2023).
3. Editor, Advances in Heat Transfer, Vol. 55, (forthcoming, 2023).
4. Editor in Chief, Numerical Heat Transfer A/B
5. Editor, Advances in Atmospheric Sciences (AAS), 2022.
6. Editor, Advances in Heat Transfer, Vol. 54, Elsevier, 2022.
7. Editor, Advances in Heat Transfer, Vol. 53, Elsevier, 2021.
8. Editor, Advances in Heat Transfer, Vol. 52, Elsevier, 2020.
9. Editor, Advances in Heat Transfer, Vol. 51, Elsevier, 2019.
10. Editor, Advances in Heat Transfer, Vol. 50, Elsevier, 2018.
11. Editor, Advances in Heat Transfer, Vol. 49, Elsevier, 2017.
12. Editor, Advances in Heat Transfer, Vol. 48, Elsevier, 2016.
13. Editor, Advances in Heat Transfer, Vol. 47, Elsevier, 2015.
14. Editor, Advances in Heat Transfer, Vol. 46, Elsevier, 2014.
15. Editor, Advances in Numerical Heat Transfer Vol. 5: Numerical Models of Heat Exchangers, Taylor and Francis, New York, 2017.
16. Editor, Small-Scale Wind Power – Design, Analysis, and Economic Impacts, Momentum Press, 2014.
17. Editor, Advances in Heat Transfer, Vol. 45, Elsevier, 2013.
18. Editor, Advances in Heat Transfer, Vol. 44, Elsevier, 2012.
19. Editor, Advances in Numerical Heat Transfer Vol. 4: Nanoscale Heat Transfer and Fluid Flow, Taylor and Francis, New York, 2012.
20. Guest Editor, Advances in Numerical Heat Transfer Vol. 3: Numerical Implementation of Biological Models and Equations, Taylor and Francis, New York, 2009.
21. Guest Editor, Special Edition of the International Journal of Heat and Mass Transfer: Bioheat and Biofluid Flow, Elsevier, Vol. 51, 23-24, November, 2008.
22. Assistant Editor, Handbook of Numerical Heat Transfer, 2nd Ed. Editors: Sparrow, Minkowycz, and Murthy, John-Wiley & Sons, Inc., New York, 2006.

Editorial Board Member

1. Water Eng. & sciences.2023-present
2. Advances in Atmospheric Sciences, 2022-present
3. International Journal of Forensic Sciences, 2023-present
4. International Society of Cardiovascular Translational Research, 2020-present
5. Energies, Thermal Management, 2019-present

6. Cardiovascular Revascularization Medicine, 2018-present
7. Stem Cell Biology and Transplantation, 2015-present
8. Associate Editor, National Center for Science Education, Climate Science, 2012-present
9. International Journal of Mechanics and Energy, 2012-present
10. Open Mechanical Engineering Journal, 2007-present
11. Open Mechanical Engineering Reviews, 2007-present
12. Open Mechanical Engineering Letters, 2007-present
13. Open Medical Devices Journal, 2008-present
14. Creative Engineering Journal, 2009-present
15. ISRN Applied Mathematics, 2011-present
16. International Journal of Sustainable Energy, 2012 - present
17. International Journal of Materials, Methods, and Technologies, 2012- present

Books

1. J.P. Abraham and B.D. Plourde, Small-Scale Wind Power – Design, Analysis, and Environmental Impacts, *Momentum Press*, 2014.

2. J.P. Abraham, P.S. Ellis, M.C. MacCracken, and G.M. Woodwell, Climate controversy 2013. New York, NY: *AuthorHouse*, 2013.

3. J.P. Abraham, E.M. Sparrow, W.J. Minkowycz, R.Ramazani-Rend, and J.C.K. Tong, All Fluid-Flow-Regimes Simulation Model for Internal Flows, *Nova Science Publishers*, Inc., Hauppauge, NY, 2011.

Book Chapters (author of 37 book chapters)

1. D.K. Vashwakarma, S. Bhattacharyya, M.L. Soni, and J.P. Abraham, Effect of Inlet Flat Obtruction on Thermohydraulic Characteristics in a Smooth Circular Tube in the Transitional Flow Regime, in Bhattacharya, Verma, Harikrishnan (eds), *Fluid Mechanics and Fluid Power, Vol. 3, Lecture Notes in Mechanical Engineering*, Springer, doi: 10,1007/978-981-19-6270-7_76.

2. F. Salamsi and J.P. Abraham, On the Finite Differences Method Using MS Excel, *Research Highlights in Mathematics and Computer Science* Vol. 6, pp 140-186, 2023.

3. F. Salamsi and J.P. Abraham, Boundary of Transition Flow Regime on Stepped Spillways by Physical Modeling, *Current Overview on Science and Technology Research*, (in press).

4. F. Salamsi and J.P. Abraham, Determination of Stilling Basin Invert Elevation and its Effect on Controlling Hydraulic Jumps, Chapter 5, *Techniques and Innovation in Engineering Research*, Vol. 2, 2022.

5. F. Salamsi and J.P. Abraham. Energy Loss at the Base of a Free Straight Drop Spillway, *Current Overview on Science and Technology Research*, Vol. 6, 2, 2022.

6. F. Salamsi and J.P. Abraham, Computation of Optimal Cross Section of Gravity Dams Using Genetic Algorithms, *Current Overview on Science and Technology Research*, Vol. 6, Chapter 1, 2022.

7. F. Salamsi and J.P. Abraham, Flow Characteristics of Skimming Regime Flow Over Stepped Spillways with Attention to Optimum Step Size, *Current Overview on Science and Technology Research*, Vol. 6, Chapter 3, 2022.

8. F. Salamsi and J.P. Abraham, Determination of Stilling Basin Invert Elevation and its Effect on Controlling Hydraulic Jumps, *Technological Innovation In Engineering Research*, (in press).

9. R. Daneshfaraz, E. Aminvash, and J.P. Abraham, Hydraulic Characteristics of Fish-Passes on Inclined Drops, *Research Developments in Science and Technology*, Vol. 4, pp. 108-123, 2022.

10. F. Salamsi, J.P. Abraham, and A. Salamsi, Design Considerations for Pumping Stations Using Variable Speed Pumps, *Novel Perspectives of Engineering Research*, Vol. 10, pp. 98-118, 2022.

11. F. Salamsi, J.P. Abraham, Drainage Gallery in Concrete Gravity Dams and its Effect on Reduction of Uplift Forces, *Novel Perspectives of Engineering Research*, Vol. 10 pp. 43-62, 2022.

12. F. Salamsi, and J.P. Abraham, Numerical Simulation Using the Finite Element Method to Investigate the Effect of Horizontal Drains and Cutoff Walls on Seepage and Uplift Pressure in Heterogeneous Earth Dams, *Novel Perspectives of Engineering Research*, Vol. 9, pp. 58-85, 2022.

13. F. Salamsi, J.P. Abraham, B. Nourani, Determining the Analysis of the Stability of Embankments Against Sliding and Prediction of Sliding and Critical Factor of Safety, *Novel Perspectives of Engineering Research*, pp. 98-125, 2022.

14. F. Salamsi and J.P. Abraham, Effect of Horizontal Drain Length and Cutoff Wall on Seepage and Uplift Pressure in Heterogeneous Earth Dam with Numerical Simulation, *Novel Perspectives of Engineering Research*, Vol. 9, pp. 58-85, 2022.

15. F. Salamsi and J.P. Abraham, Numerical Investigation of Reduction of Uplift Forces by Drain Pipes Under the Bed of a Canal, *Novel Perspectives in Engineering Research*, Vol. 7, pp. 117-139, 2022.

16. F. Salamsi and J.P. Abraham, A Case Study on the Weep Hole and Cutoff Wall Effect for Decreasing Uplift Pressure on Hydraulic Structures, *Innovations in Science and Technology*, Vol. 6, pp. 12-38, 2022.

17. F. Salamsi and J.P. Abraham, Comparison of Uplift Pressure and Hydraulic Gradient in Three Types of Dams: Concrete Gravity dams, Homogeneous, and Hetergogneous Earth-Filled Dams, *Innovations in Science and Technology*, Vol. 3, pp. 71-86, 2022.

18. F. Salamsi and J.P. Abraham, Geological Considerations in Dam Engineering, *Novel Perspectives of Engineering Research*, Vol. 6, pp. 97-125, 2022.

19. B.D. Plourde, J. Kilonzo, J. Kiplagat, J.P Abraham, and L. Cheng, From Sunlight to Drinking Water – The Design and Validation of a Solar-Pasteurization System, Published in *Handbook of Research on Heat Transfer*, edited by S. Bhattacharyya and V. Goel, Chapter 16, 2022.

20. A. Salamsi, J.P. Abraham, and F. Salamsi, Prospects for Application of Nanotechnology in Marine Industries, *Innovations in Science and Technology*, Vol. 4, pp. 84-106, 2022.

21. F. Salamsi and J.P. Abraham, Validity of Schaffernak and Casangrande analytical solutions for Seepage Through a Homogeneous Earth Dam and Comparison with Numerical Solutions Based on the Finited Element Method, in *Novel Perspectives of Engineering Research*, Vol. 4, pp. 79-93, 2021.

22. F. Salamsi and J.P. Abraham, Effect of Embankment Soil Layers on Stress-Strain Characteristics, *Recent Progress in Plant and Soil Research*, Vol. 4, pp. 68-84, 2021

23. F. Salamsi and J.P. Abraham, Study on the Effect of Inclination of Cutoff Wall Beneath Gravity Dams on Uplift Force, in *Novel Perspectives of Engineering Research*, Vol. 1, pp. 38-57, 2021.

24. J.P. Abraham, S. Bhattacharya, L. Cheng, and J.M. Gorman, A Brief History of and Introduction to Computational Fluid Dynamics, in *Computational Fluid Dynamics*, edited by: Suvanjan Bhattacharya, published by IntechOpen, 2021.

25. F. Salamsi and J.P. Abraham, The Method of Characteristics Applied to the Sensitivity Analysis for Water Hammer Problems, *New Approaches in Engineering Research*, B.P. International, Vol. 9, pp. 50-63, 2021.

26. J. Gorman, S. Bhattacharya, J.P. Abraham,, L. Cheng, Turbulence Models Commonly used in CFD, in: *Computational Fluid Dynamics*, edited by: Suvanjan Bhattacharya, published by IntechOpen, 2021.

27. J.M. Gorman, M. Regnier, and J.P. Abraham, Heat Exchange Between the Human Body and the Environment – A Comprehensive, Multi-Scale Numerical Simulation, in: *Advances in Heat Transfer*, Vol. 52, 2020.

28. L.E. Olsen, J.P. Abraham, L.J. Cheng, J.M. Gorman, E.M. Sparrow, Summary of Forced-Convection Fluid Flow and Heat Transfer for Square Cylinders of Different Aspect Ratios Ranging from the Cube to a Two-Dimensional Cylinder, in: *Advances in Heat Transfer*, Vol. 51, pp. 351-457, 2019.

29. E.M. Sparrow, J.M. Gorman, A. Ghoash, J.P. Abraham, Enhancement of Jet Impingement Heat Transfer by Means of Jet Axis Switching, in: *Advances in Heat Transfer*, Vol. 50, 2018.

30. E.M. Sparrow, J.M. Gorman, J.P. Abraham, W.J. Minkowycz, Validation of Turbulence Models for Numerical Simulation of Fluid Flow and Convective Heat Transfer, in: *Advances in Heat Transfer*, Vol. 49, 397-421, 2017.

31. J.M. Gorman, E.M. Sparrow, J.P. Abraham, W.J. Minkowycz, Heat Exchangers and Their Fan/Blower Partners Modeled as a Single Interacting System by Numerical Simulation, in: *Advances in Numerical Heat Transfer Vol. 5*, Taylor and Francis, New York, 2017.

32. J.P. Abraham, B.D. Plourde, L.J. Vallez, B.B. Nelson-Cheeseman, J.R. Stark, J.M. Gorman, E.M. Sparrow, Skin Burn, in: *Theory and Application of Heat Transfer in Humans*, edited by Devashish Shrivastava, Wiley, June 2018.

33. M.W. Dewhirst, J.P. Abraham, B.L. Viglianti, Evolution of Thermal Dosimetry for Application of Hyperthermia Treatment to Cancer, in: *Advances in Heat Transfer*, Vol. 47, 397-421, 2015.

34. B.D. Plourde, E.D. Taylor, P.O. Okaka, and J.P. Abraham, Financial and Implementation Considerations for Small-Scale Wind Power, in: *Small-Scale Wind Power – Design, Analysis, and Economic Impacts*, Momentum Press, 2014.

35. B.D. Plourde, E.D. Taylor, W.J. Minkowycz, and J.P. Abraham, Introduction to Small-Scale Wind Power, in: *Small-Scale Wind Power – Design, Analysis, and Economic Impacts*, Momentum Press, 2014.

36. J.P. Abraham, E.M. Sparrow, W.J. Minkowycz, R. Ramazani-Rend, and J.C.K. Tong, Modeling Internal Flows by an Extended Menter Transition Model, in: *Turbulence: Theory, Types, and Simulation*, Nova Publishers, New York, 2011.

37. S. Ramadhyani, J.P. Abraham, and E.M. Sparrow, A Mathematical Model to Predict Tissue Temperatures and Necrosis During Microwave Thermal Ablation of the Prostate, in: *Advances in Numerical Heat Transfer Vol. 3: Numerical Implementation of Bioheat Models and Equations*, Taylor and Francis, New York, 2009.

38. J.P. Abraham and E.M. Sparrow, Heat-Transfer and Temperature Results for a Moving Sheet Situated in a Moving Fluid, in: *Heat-Transfer Calculations, 2nd ed.*, editor, Myer Kutz, McGraw-Hill, 2005.

Publications (author of 271 journal papers)

2023

1. R. Daneshfaraz, E. Aminvash, S. Veli, M. Rezair, A. Ghaderi, and J.P. Abraham, Experimental Study of New Green and Non-Structual Materials Effects on Scour Reduction Downstream of a Screen, Water, Infrastructure, Ecosystems, and Society, (accepted).

2. S. Abbasi, M. Seifollahi, R. Daneshfaraz, F. Mohammadi, J.P. Abraham, and H. Abbaszadeh, Estimation of Vertical Settlement of Earthen Dams Caused by Earthquake Using ANN Model and Wavelet-ANN Composition, Geotechnical and Geological Engienering, (in press), 2023.

3. S. Abbasi, S. Ravaz, M. Heidapour, R. Daneshfaraz, J.P. Abraham, Investigating and Comparing the Performance of Collar and Cable Composition on Scouring of Cylindrical Bridge Piers, Sadhana Academy Processdings in Engineering Sciences, (accepted).

4. A. Aghdam, F. Salamsi, A. H. Zadeh Dalia, A. Abbaspoour, and J.P. Abraham, Experimental and Numerical Investigation of the Trajectories of Free and Pressurized Jets Through Storage Dams, *Water Supply*, Vol. 23, paper no. 1297, 2023.

5. Y. Pan L. Cheng. K. von Schuckmann, K.E. Trenberth, G. Li, J.P. Abraham, Y. Liu, V. Gouretski, Y.Yu, H. Liu, C. Liu, Annual Cycle in Upper Ocean Heat Content and the Global Energy Budget, *J. Climate*, (accepted).

6. M. Haghdoost, E. Lakzian, R. Norouzi, J.P. Abraham, S. Sajjadi, and J. Ahadiyan, Numerical Simulation Using the Finite Element Method to Investigate the Effect of Internal

Cutoff Walls on Seepage and Hydraulic Graients in Homogeneous Earth Dams, Modeling Earth Systems and Environment, (in press), doi: 10.1007/s40808-023-01755-w, 2023.

7. D.K. Vishwakarma, S. Bhattacharya, M.K. Sonja, and J.P. Abraham, Thermal and Flow Analysis of Air in a Uniformly Heated Channel with an Inlet Flap Obstruction in Laminar, Transitional, and Turbulent Flow Regimes, *Heat Transfer Engineering* (accepted).

8. F. Salamsi, F. Nahrain, J.P. Abraham, and A.T. Aghdam, Prediction of Discharge Coefficients for Broad-Crested Weirs Using Expert Systems, Journal of Hydraulic Engineering, Vol. 29, pp. 1-11, 2023.

9. J.P. Abraham, T. Wei, L. Cheng, Validation of a New Method of Providing Case-Specific Time-of-death Estimates Using Cadaver Temperatures, *Journal of Forensic Science*, (in press).

10. F. Salamsi and J.P. Abraham, Hydraulic Characteristics of Flow Over Stepped and Chute Spillwas (Case Study: Zirdan Dam), *Water Supply*, Vol. 23, pp. 851-866, 2023.

11. M. Seifollahi, S. Abbasi, A. Pourtaghi, R. Daneshfaraz, and J.P. Abraham, Performance Efficiency of Data-Based Hybrid Intellient Approaches to Predict Crest Settlement in Rockfill Dams, *Arabian Journal of Geosciences*, Vol. 15, paper 1701, 2023.

12. M. Naghavi, M. Mohammadi, G. Mahtabi, and J.P. Abraham, Experimental Assessment of Velocity and Bed Shear Stress in the Main Channel of a Meandering Compund Channel with One-Sided Blocks in Floodplain, *Journal of Hydrology*, (accepted).

13. T. Wei and J.P. Abraham, Comment on the Marshall-Hoare-Henssge Model for Estimating the Time Since Death, *Journal of Forensic Science*, (accepted).

14. R. Daneshfaraz, R. Norouzi, P. Ebadzadeh, S. Di Francesco, J.P. Abraham, Experimental Study of Geometric Shape and Sill of Sill Effects on the Hydraulic Performance of Sluice Gates, *Water*, Vol. 15, paper no. 314.

15. L. Cheng, J.P. Abraham, K.E. Trenberth, J.T. Fasullo, T. Boyer, M.E. Mann, J. Zhu, F. Wang, R. Locarnini, Y. Li, B. Zhang, F. Yu, L. Wan, X. Chen, X. Song, Y. Liu, F. Reseghettic, S. Simoncelli, V. Gouretski, G. Chen, A. Mishonoc, J. Reagan, and G. Li, Another Year of Record Heat for the Oceans, *Advances in Atmospheric Sciences*, (in press).

16. A.T. Aghdam, A. Hosseinzadeh, F. Salamsi, A. Abbaspour, and J.P. Abraham, Numerical and Experimental Study of Trajectory for Free Falling Jets, *Iranian Journal of Science and Techniology*, (in press).

17. Y. Pan, L. Cheng, K. von Schuckmann, K.E. Trenberth, B. Li, J.P. Abraham, Y. Li, V. Gouretski, Y Yu, H. Liu, and C. Lei, Annual Cycle in Upper Ocean Heat Budget Content and Global Energy Budget, *Journal of Climate* (submitted).

18. T. Wei, J.P. Abraham, and Y. Wang, New Temperature and Heat Loss Charts for One-Dimensional, Transient Heat Conduction, *Journal of Heat Transfer*, Vol. 145, paper no. 014502, 2023.

2022

19. L. Cheng, K. von Schuckmann, J.P. Abraham, K. Trenberth, M. Mann, L. Zanna, M.H. England, J. D. Zika, J. Fasullo, Y. Yu,, Y. Pan, J. Zhu, E. Newsom, B. Bronselaer, and X. Lin, Past and Future Warming, *Nature Reviews Earth and Environment*, Vol. 3, pp. 778-794 (**Altmetric – 595, May 2023, top 1% of similar papers)**.

20. F. Salamsi, P. Sihag, J.P. Abraham M. Nouri, Experimental Investigation and Prediction of Free Fall Jet Scouring Using Machine Learning Models, *International Journal of Sediment Research*, Vol. 38, pp. 1-20, 2022.

21. R. Daneshfaraz and J.P. Abraham, Laboratory Study of Energy Dissipation on Gabion Vertical Drop, *Innovative Infrastructure Solutions*, Vol. 7, article number 328, 2022.

22. J.P. Abraham and L. Cheng, Intersection of Climate Change, Energy, and Adaptation, *Energies*, Vol. 15, paper no. 5886, 2022.

23. Y. Wang, H. Wan, T. Wei, and J.P. Abraham, Enhancement of Heat and Mass Transfer By Herringbone Microstructures in a Simple Shear Flow, *Physics of Fluids*, Vol. 34, paper no. 082012, 2022.

24. M. Seifollahi, S. Abbasi J.P. Abrahan, R. Norouzim R. Daneshfaraz, M-A. Lotfollahi-Yaghin, and A. Alkan, Optimization of Gravity Concrete Dams Using the Grasshopper Algorithm (Case Study: Koyna Dam), Geotechnical and Geological Engineering, Vol. 40, pp. 5481-5496, 2022.

25. T. Tian, L. Cheng, G. Wang, J.P. Abraham, J. Zhu, J. Song, and H. Leng, Reconstructing High-Resolution Ocean Subsurface Salinity State Using Machine Learning Approach, *Earth System Science Data* (in press).

26. J.P. Abraham, L. Cheng, M.E. Mann, K.E. Trenberth, K. von Schuckmann, The Ocean Response to Climate Change Guides Both Adaptation and Mitigation Efforts, *Atmospherical and Oceanic Science Letters*, Vol. 15, paper no. 100221, 2022.

27. R. Biabani, F. Salamsi, M. Npouri, and J.P. Abraham, Flow Over Embankment Gabion Weirs in Free Flow Conditions, *Journal of Hydro-Environmental Research*, Vol. 44, pp. 65-76, 2022.

28. B. Nourani, F. Salamsi, H. Arvanaghi, and J.P. Abraham, Development of Explicit Formulas for Estimating Seepage Characteristics Underneath Aprons with Equal and Unequal End Vertical Double-Piles, *International Journal of Geomechanics*, Vol. 22, paper no. 04022237, 2022.

29. L. Cheng, G. Foster, Z. Hausfather, K.E. Trenberth, J.P. Abraham, Improved Quantification of the Rate of Ocean Warming, *Journal of Climate*, Vol. 35, pp. 4827-4840, 2022.

30. F. Salamsi and J.P. Abraham, Effect of Slope on Energy Dissipation for Flow Over a Stepped Spillway, *Water Supply*, Vol. 22, pp. 5056-5069, 2022.

31. Y. Liu, L. Cheng, Y. Pan, Z. Tan, J.P. Abraham, B. Zhang, J. Zhu, and J. Song, How Well do CMIP6 and CMIP5 models simulate the climatological seasonal variations in ocean salinity, *Advances in Atmospheric Sciences*, doi: 10.1007/s00376-022-1381-2.

32. J.M. Gorman, W. Tan, and J.P. Abraham, Numerical Simulation of Microwave Ablation in the Human Liver, Heat Transfer in Biomedical Applications, edited by A. Andreozzi, M. Iasiello, V. Timochenko, and K. Vafai, published in *Processes*, Vol. 10, paper no. 361, 2022.

33. F. Salamsi, S. Shadkani, J.P. Abraham, F. Malekzadeh, Experimental Investigation For Determination of Discharge Coefficients for Inclined Slide Gates and Comparison with Data-Driven Models, *Iranian Journal of Science and Technology, Transactions of Civil Engineering*, Vol. 46, pp. 2495-2509, 2022.

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2. L. Cheng, and J.P. Abraham, Perspectives on Ocean sand Their Role in the Global Energy Budget and Water Cycle, *American Meteorological Society 102nd Annual Meeting, Houston, Kevin Trenberth Symposium*, January 23-27, 2022 (invited).

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8. L. Cheng, K. Trenberth, K. von Schukmann, J.P. Abraham, V. Gouretski, Oceanic Responses to the Climate: Recognizing Changes and Extremes, *AAAS Annual Meeting*, February 11, 2021.

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18. J.P. Abraham, Climate Change, the Evidence is in the Oceans, *Presented at the National Laboratory for Marine Science and Technology*, Qingdao, China, October 25, 2018.

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61. J.P. Abraham, Measurements of the Earth's Climate System, *IEEE Conference on Instrumentation and Measurement Technology Conference*, Minneapolis, MN, May 6, 2013.

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102. K.L. McCaffrey, K.M. Rose, and J.P. Abraham, Numerical Simulation of Cryosurgery as a Potential Treatment for Uterine Fibroids, *14th International Heat Transfer Conference*, Washington, D.C., August 8-13, 2010.

103. J.P. Abraham, E.M. Sparrow, J.C.K. Tong, and W.J. Minkowycz, Intermittent Flow Modeling. Part 1: Hydrodynamic and thermal Modeling of Steady, Intermittent Flows in Constant Area Ducts, *14th International Heat Transfer Conference*, Washington, D.C., August 8-13, 2010.

104. J.P. Abraham, E.M. Sparrow, J.C.K. Tong, and W.J. Minkowycz, Intermittent Flow Modeling. Part 2: Time-Varying Flows and Flows in Variable Area Ducts, *14th International Heat Transfer Conference*, Washington, D.C., August 8-13, 2010.

105. K.L. McCaffrey, K.M. Rose, and J.P. Abraham, Cryosurgery as an Alternative Treatment for Menorrhagia and Uterine Fibroids, *ASME Summer Biomedical Engineering Conference*, Naples, FL, June 16-19, 2010.

106. J.M. Gorman, N.K. Sherrill, J.P. Abraham, Analysis of Drag-Reducing Techniques for Olympic Skeleton Helmets, *ANSYS Users Conference*, Minneapolis, MN, June 11, 2010.

107. B. D. Plourde, J.P. Abraham, G.S. Mowry, Numerical Simulation of Vertical Axis Wind Turbines, *ANSYS Users Conference*, Minneapolis, MN, June 11, 2010.

108. J.P. Abraham, Z.I. Helgeson, N.N. Johnson, G.S. Mowry, Numerical Simulations and Medical Device Design, *ANSYS Users Conference*, Minneapolis, MN, June 11, 2010.

109. J.M. Gorman, N.K. Sherrill, J.P. Abraham, Drag-Reducing Vortex Generators and Olympic Skeleton Helmet Design, *ANSYS Users Conference*, Chicago, IL, June 7, 2010.

110. J.P. Abraham, Z.I. Helgeson, N.N. Johnson, G.S. Mowry, (Keynote), Numerical Simulations in Biomedical Design, *ANSYS Users Conference*, Chicago, IL, June 7, 2010.

111. J.P. Abraham, E.M. Sparrow, Y. Bayazit, R.D. Lovik, and D.S. Smith, Numerical and Experimental Simulations as Symbiotic Tools for Solving Complex Bio-Thermal Problems, *Design of Medical Devices Conference*, Minneapolis, MN April 13-15, 2010.

112. E.M. Sparrow and J.P. Abraham, Numerical Solutions of Biological Heat Transfer, *Design of Medical Devices Conference*, Minneapolis, MN April 13-15, 2010.

113. J.P. Abraham, R.D. Lovik, D.S. Smith, E.M. Sparrow, and K.J. Kelly, Heat Generation Measurements of Revised Neuromodeulation Devices and Calculations of Tissue Temperatures, *North American Neuromodulation Society 13th Annual Meeting*, Las Vegas, December 3-6, 2009.

114. J.P. Abraham and E.M. Sparrow, Numerical Simulation as a Tool for Assessing Thermal- and Fluid-Based Processes and Therapies, *Institute for Engineering in Medicine Innovation Showcase*, Minneapolis, MN, September 22, 2009.

115. J.P. Abraham, E.M. Sparrow, and R.D. Lovik, An Investigation of Tissue-Temperature Elevation Caused by Recharging of Transcutaneous Nueromodulation Devices, *31st Annual International Conference of the IEEE Engineering in Medicine in Biology Society*, Minneapolis, MN, September 2-7, 2009.

116. R.D. Lovik, J.P. Abraham, and E.P. Sparrow, Pulasting Fluid Flows Undergoing Transitions Between Laminar, Transitional, and Turbulent Regimes, *ASME 2009 Summer Bioengineering Conference*, Lake Tahoe, CA, June 17-21, 2009.

117. E.M. Sparrow, and J.P. Abraham, Case Studies on the Use of Numerical Simulation for design and Optimization of Medical Devices, *Design of Medical Devices Conference*, Minneapolis, MN April 14-16, 2009.

118. F. Hoover and J. Abraham Assessment of the Carbon Dioxide and Energy Balances of Biofuels, *Climate Change Technology Conference 2009*, Hamilton, Ontario, May 12-15, 2009.

119. J.P. Abraham, G.S. Mowry, and R.E. Erickson, Design and Analysis of a Small-Scale Vertical-Axis Wind Turbine for Rooftop Power Generation, *Climate Change Technology Conference 2009*, Hamilton, Ontario, May 12-15, 2009.

120. F. Hoover and J.P. Abraham, A review: Comprehensive Comparison of Corn-based and Cellulosic-based Ethanol as Biofuel Sources, *Clean Technology Conference and Expo 2009*, Houston, TX, May 3-7, 2009.

121. J.P. Abraham, G.S. Mowry, and R.E. Erickson, Design and Analysis of a Small-Scale Vertical-Axis Wind Turbine, Clean *Technology Conference and Expo 2009*, Houston, TX, May 3-7, 2009.

122. J.P. Abraham, R.D. Lovik, and E.M. Sparrow, Tissue Temperature Rises Due to Heat Generation in Neuromodulation Implants, North American Neuromodulation Society 12th Annual Meeting, Las Vegas, December 4-7, 2008.

123. G. Nelson, A. Majewicz, and J.P. Abraham, Numerical Simulation of Thermal Injury to the Artery Wall During Orbital Atherectomy, *ANSYS International*, Pittsburgh, PA, August 26-29, 2008.

124. J.P. Abraham, Integrating Integration of ANSYS/CFX into Classrooms, *ANSYS International*, Pittsburgh, PA, August 26-29, 2008.

125. J.P. Abraham, Pressure Drop and Heat Transfer Calculations for Laminar-Turbulent Intermittent Flows, *ANSYS International*, Pittsburgh, PA, August 26-29, 2008.

126. J.P. Abraham, J.C.K. Tong, and E.M. Sparrow, Prediction of Laminar-Turbulent Transition and Friction Factors in Transitional Flows, *ASME International Congress and Expo*, Boston, MA, October 31 – November 5, 2008.

127. R.D. Lovik, J.P. Abraham, and E.M. Sparrow, Assessment of Possible Thermal Damage of Tissue Due to Atherectomy by Means of a Mechanical Debulking Device, *ASME 2008 Summer Bioengineering Conference*, Marco-Island, FL, June 25-29, 2008.

128. J.P. Abraham and A.P. Thomas, Numerical Simulation of Induced Co-Flow and Laminar-to-Turbulent Transition Associated with Synthetic Jets, *Flucome 2007*, Tallahassee, FL, September 16-19, 2007.

129. J.P. Abraham and C.M. George, An Investigation of Radiation Shields for Full-Building Cooling in Desert Climates, *Solar 2007*, Cleveland, OH July 7-12, 2007.

130. A. Marchese, J.P. Abraham, C.S. Greene, L. Kizenwether, and J. Ochs, Toward a Common Standard Rubric for Evaluating Capstone Design Projects, *National Capstone Design Course Conference*, Boulder, CO June, 13-15, 2007 (Best Paper Award).

131. John Abraham, Chris Greene, Anthony Marchese, External Assessment Through Peer-to-Peer Evaluation of Capstone Projects, *Frontiers in Education*, Milwaukee, WI, October, 10-13, 2007.

132. John Abraham, Computation Fluid Dynamics Using ANSYS CFX, presented at the University of Minnesota Digital Technology Center, Sept. 12 and 14, 2006.

133. John Abraham, Application of the Finite Element Method, *LifeSciences Conference*, Minneapolis, October 5, 2006.

134. John Kim and John Abraham, Design of Experiments in the Medical Device Industry, *LifeSciences Conference*, Minneapolis, October 5, 2006.

135. Ephraim Sparrow, Nick Whitehead, and John Abraham, Fluid Flow Dynamics in the Urinary Tract – Impact on Device Design, Presented to the Department of Urologic Surgery, April 17, 2006.

136. John Abraham, Nick Whitehead, and Ephraim Sparrow, Numerical Simulation of Thermal Therapies, Presented to the Department of Urologic Surgery, April 17, 2006.

137. John Abraham, Nick Whitehead, and Ephraim Sparrow, Biomedical Applications Simulations/Experimental Investigations, *Biomedical Focus 2006*, Brooklyn Center, MN, March 20-21, 2006.

138. Nick Whitehead, Ephraim Sparrow, and John Abraham, A Role for Engineering in Medical Simulations, *Simulation in Healthcare*, Minneapolis, MN, November 28, 2005.

139. Ronald Major and John Abraham, The Application of Thermal Analysis on a Disk Array, *Fluent's 2005 CFD Summit*, Detroit, MI, June 7-8, 2005.

140. Camille George and John Abraham, A Sustainable Low-Energy Cooling System for Hot Dry Climates, *Sustainability as Security*, Austin, TX, October 5-9, 2005.

141. John P. Abraham and Ephraim M. Sparrow, Irrelevance of the Relative Velocity as the Characteristic Velocity When Both a Fluid and its Bounding Surface are in Motion, *Lorenz G. Straub Award*, Minneapolis, MN, November 13, 2004.

142. John P. Abraham and Ephraim M. Sparrow, An Unexpected U-Turn After an Eckert Straight Start, *Eckert Symposium*, Minneapolis, MN, September 13-14, 2004.

143. John P. Abraham and Ephraim M. Sparrow, Methodologies to Enhance the Numerical Simulations of Electronic Cooling, *Semi-Therm Conference*, San Jose, CA, March 9-10, 2004.

144. Ephraim M. Sparrow, John P. Abraham, and Paul Chevalier, A DOS-Enhanced Numerical Simulation of Heat Transfer and Fluid Flow Through an Array of Offset Fins with Conjugate Heating in the Bounding Solid, *ASME International Mechanical Engineering Congress and R & D Expo*, Washington, DC, November, 2003.

145. J. P. Abraham, Ephraim M. Sparrow, Student-Related Research "Thermal Design Capstone Projects", *ASME International Mechanical Engineering Congress and R & D Expo*, Washington, DC, November, 2003.

146. Sparrow, E.M., Martin, G.L., Abraham, J.P., and Tong, J.C., Air-to-Air Energy Exchanger Test Facility for Mass and Energy Transfer Performance. *American Society of Heating, Refrigeration, and Air-Conditioning Engineers Annual Meeting*, Inc., Cincinnati, OH, ASHRAE Symposium Paper, 2001.

147. Tamma, K.K., Zhou, X., Abraham, J., and Anderson, C.V.D.R., Constitutive Model Theories and Plausible Propositions/Challenges to Heat Transport Characterization. *ASME/JSME Joint Thermal Engineering Conference*, March, 1999.

Granted Patents (author of 16 patents)

1. Robert Monson and John Abraham, “Dual-phase thermal electricity generator”, U.S. Patent # 8,484,974.

2. Robert Monson and John Abraham, “Variable Orifice Valve”, U.S. Patent # 7,559,485

3. Robert Monson, John Abraham, Joseph Crimando, Joel Farley, Matthew Linder, and Joel Seipel, "Vehicle Energy Absorption Apparatus”, US Patent # 8,118,255.

4. B.D. Plourde and J.P. Abraham, “Rotor Blade for Vertical Axis Wind Turbine”, US Patent # 9,482,204/ WO 2011150171.

5. B.D. Plourde, J.P. Abraham, D.R. Plourde, A. Gikling, R. Pakonen, “Dual-Axis Tracking Device”, US Patent # 10,168,412.

6. B. D. Plourde, J. P. Abraham, D.R. Plourde, R. Pakonen, “Control Valve Assembly for Fluid Heating System”, US Patent # 10,495,720.

7. B. D. Plourde, J. P. Abraham, D.R. Plourde, R. Pakonen, “Dual Axis Tracking Device”, China National Intellectual Property Administration, Patent number ZL201580075224.1, 2020.

8. B.R. Plourde, J. P. Abraham, D.R. Plourde, R. Pakonen, “Dual Axis Tracking Method”, U.S. Patent 10,890,645.

9. B.D. Plourde, A. Gikling, J.P. Abraham, R. Pakonen, “Digital Fluid Heating System”, US Patent Application Number 15/818,052, filed November 20, 2017; PCT Application Number US2017/062558, filed November 20, 2017. (Patent granted, number forthcoming).

10. B.D Plourde, J.P. Abraham, D. Plourde, R. Pakonen, A. Gikling, N. Naughton, Fluid Heating system, European Patent, granted, number forthcoming, 2021.

11. B. D. Plourde, J. P. Abraham, D.R. Plourde, R. Pakonen, “Method of Calculating Pathogen Inactivation for a Fluid Heating System”, US Patent, 11,255,804.

12. B.D. Plourde, A. Gikling, J.P. Abraham, R. Pakonen, “Digital Fluid Heating System”, China National Intellectual Property Administration, Chinese Application Number 201780083752.0

13. B.D. Plourde, A. Gikling, J.P. Abraham, R. Pakonen, “Digital Fluid Heating System”, African Regional Intellectual Property Organization (ARIPO), (patent granted, number forthcoming).

14. B.D. Plourde, A. Gikling, J.P. Abraham, R. Pakonen, “Digital Fluid Heating System”, European Union number EP 4,080,134.

15. B.D. Plourde, A. Gikling, J.P. Abraham, R. Pakonen, “Digital Fluid Heating System”, European Union number EP3,542,107.

16. B.D. Plourde, A. Gikling, J.P. Abraham, R. Pakonen, “Digital Fluid Heating System”, Columbia, Application number NC 2019/00006027, (*number to be issued*).

17. B.D. Plourde, A. Gikling, J.P. Abraham, R. Pakonen, and D. Plourde, Solar Heating for Refrigeration and Fluid Heating Devices, Colombian Application No. 2019/0011368, (number to be issued).

Pending Patents

1. B.D. Plourde, J.P. Abraham, D. Plourde, R. Pakonen, A. Gikling, N. Naughton, "Fluid Heating System", US Patent Application Number 14/954,292, filed December 1, 2015.

2. B.D. Plourde, J.P. Abraham, "Solar Heating System", US Patent Application No. 62/423,814 (filed November 18, 2016).

3. B.D. Plourde, A. Gikling, J.P. Abraham, R. Pakonen, "Solar Heating for Refrigeration and Fluid Heating Devices", filed March 2018. US Application number 20180266712.

4. B.D. Plourde, A. Gikling, J.P. Abraham, R. Pakonen, "Dual-Axis Tracking Method", US Application number 2019/0107598, filed November 2018.

5. B.D. Plourde, A. Gikling, J.P. Abraham, R. Pakonen, "Digital Fluid Heating System", US Application number 2018/0142905, filed November 2017.

Granted Trademarks

1. US Trademark Registration Number 5656322, assignee: WTS LLC, Minnesota, USA. Trademark granted, January 15, 2019.

2. US Trademark Registration Number 5656323, assignee: WTS LLC, Minnesota, USA. Trademark granted, January 15, 2019.

Editorial Board Member

18. International Society of Cardiovascular Translational Research, 2020-present
19. Energies, Thermal Management, 2019-present
20. Cardiovascular Revascularization Medicine, 2018-present
21. Stem Cell Biology and Transplantation, 2015-present
22. Associate Editor, NCSE, Climate Science, 2012-present
23. International Journal of Mechanics and Energy, 2012-present
24. Open Mechanical Engineering Journal, 2007-present
25. Open Mechanical Engineering Reviews, 2007-present
26. Open Mechanical Engineering Letters, 2007-present
27. Open Medical Devices Journal, 2008-present
28. Creative Engineering Journal, 2009-present
29. ISRN Applied Mathematics, 2011-present
30. International Journal of Sustainable Energy, 2012 - present
31. International Journal of Materials, Methods, and Technologies, 2012- present

CONSULTANTSHIPS

GRANTS (funding $24.02 million)

Varian Medical Systems	**2023-present**
Flotherm	**2021-present**
LEMA, LLC, MN	**2016-present**
HRST, Inc., MN	**2021**
Biotronik	**2021**

Starky	**2020**
Marvin Windows	**2020-2022**
Cardiovascular Systems, Inc.	**2019-2021**
ALS Consulting	**2019**
Medivator, MN	**2018-2019**
Medivators, MN	**2014-2015**
EKOS, MN	**2018**
Marcor	**2018**
Marvin Windows	**2018**
Medtronic, Fridley, MN	**2017-2020**
Orbital ATK	**2017-2018**
Pride Engineering, MN	**2017-2018**
Cargill, MN	**2016-2017**
EKOS, MN	**2016-2017**
Precision Air, MN	**2016**
3M, MN	**2015-2017**
Flourescence, Inc., MN	**2015**
Smiths Medical, MN	**2014-2015**
WTS LLC, MN	**2014-2022**
Somnetics, MN	**2014**
Lake Region Medical, MN	**2013-2014**
Amphora Medical, MN	**2013-2014**
ALS Consulting, MN	**2013-2016**
Medtronic, Fridley, MN	**2013-2016**
Devicix, MN	**2012-2013**
CriticCare, MN	**2012**
HRST, Inc., MN	**2012-2015**
QIG Group, OH	**2011-2013**
Phraxis, MN	**2011-2012**
Cardiovascular Systems, Inc., Roseville, MN	**2007-2015**
Translational Biologic Infusion, AZ	**2011-2013**
Galil Medical, Roseville, MN	**2011**
Imation, Oakdale, MN	**2010**
Medtronic, Fridley, MN	**2008-2011**
R4 Engineering, India	**2008-2009**
Horizontal Winds,	**2008-2**
Lockheed Martin, Eagan, MN	**2007-2009**
St. Jude Medical, Minnetonka, MN	**2007-2009**
Arizant Medical, Eden Prairie, MN	**2006**
Johnson and Johnson, Newark, NJ	**2004-2005**
Cortron/XeteX, Fridley, MN	**2005**
MicroControl Company, MN	**circa 2001**
Donaldson Co., Bloomington, MN	**1999-2003**
Augustine Medical, Eden Prairie, MN	**2000-2003**
Midmac Systems Inc., St Paul, MN	**2002**
Remmele Engineering Inc., St Paul, MN	**2002-2005**
Urologix, Minneapolis, MN	**circa 2004**
Restore Medical, Minneapolis, MN	**circa 2002**
Jennio, Minnesota	**circa 2001**
Caterpillar, Minneapolis, MN	**circa 2000**
ADC telecom, Minneapolis, MN	**circa 2000**

Entropy Solutions **circa 2000**
XeteX, Inc., Minneapolis, MN **1996-2000**
Pneuseal, St. Paul, MN **1996-1998**
Los Alamos National Laboratory, Los Alamos, NM **1994**

GRANTS (funding $24.02 million)

Varian Medical Systems, Inc. **2023**
Brain thermal transport, oncology applications

LEMA, LLC **2016-2022**
$20m for development and deployment of solar-power off grid systems.
Part of Consolidated Appropriations Act, 2023

HRST, Inc. **2021**
$34,000 for analysis of flow patterns in power plants

Biotronik **2021**
$44k for simulation of heating caused by implanted medical devices

Flotherm (SBIR award FAIN 2034065) **2020-2023**
$20k for simulation of body-heating devices
$48k for simulation of body-heating devices
SBIR funding, NSF Small Business Innovative Research project

Starky **2019-2020**
$6k for thermal modeling of hearing aid batteries

National Science Foundation (Co-PI, FAIN = 2018403) **2020-2021**
$424k for engineering PIV instrumentation

Intertek **2019-2020**
$13k for study of tissue surrogates for biological heating

Cardiovascular Systems, Inc. **2019-2021**
$13k for thermal model of blower impellor for a dialysis pump

$9k for thermal model of blower impellor for a dialysis pump

$4k for thermal model of blower impellor for a dialysis pump
$20k for flow model of blower impellor for a dialysis pump
$5k for flow model of blower impellor for a dialysis pump

ALS Consulting **2019**
$15k for thermal model of power plant

Medivators **2019**

$12k for thermal model of thermal sterilization

Marvin Windows **2019-2022**

$4k for thermal analysis of a tiny home

$5k for thermal model of manufacturing line

$4k for thermal model of manufacturing line

Medtronic **2019**

$22k for simulation of tissue temperatures during transcutaneous recharge
$25.5k for simulation of tissue temperatures during transcutaneous recharge

Medivators **2018**

$18k to research airflow in medical sterilization equipment.

Marvin Windows **2018-2020**

$6k to research thermal processes during window ventillation
$4k to research thermal processes of natural lighting
$4k to research thermal processes of natural lighting

Medtronic **2018**

$3k to research battery heating rates
$8k to research thermal tolerance of brain tissue

EKOS **2018**

$14k for analysis of flow distribution within stents

Marcor **2018**

$10k for fluid and heat transfer analysis

Pride Engineering **2017**

$3k to calculate a metal stamping machine process

Orbital ATK **2017-2018**

$30k to simulate fluid flow
$12k to simulate fluid flow

Medtronic **2017**

$5k to research thermal tolerance of brain tissue
$14k to calculate cranial temperature increases during transcranial recharge

3M **2017**

$14k to simulate airflow in ultra-clean operating rooms.

Zoll Engineering **2017**

$5.5k for design of flow through a ventilation medical device

Cargill **2016-2017**

$14k for analysis of food frier
$15k for analysis of a food processing device

EKOS **2017**

$14k for analysis of flow distribution within stents
$14k for analysis of flow distribution within stents
$12k for analysis of flow distribution within stents

ALS Consulting **2016**

$15k for analysis of fluid flow in power plants

Precision Air **2016**

$1600 for simulation of airflow in operating rooms

Medtronic **2016**

$12k for simulation of tissue temperatures during transcutaneous recharge

3M **2015**

$12k to simulate airflow in ultra-clean operating rooms.

Cardiovascular Systems, Inc. **2015-2016**

$8,000 for the study of deformable arteries
$6,000 for biological flows and impellor design

AF Energy **2015**

$3000 wind turbine calculations

Intellectual Ventures Laboratory **2015**

$2000 wall condensation calculations

Medivators **2015**

$4000 for flow and pressure calculations medical chamber.

Floursecence, Inc. **2015**

$2,000 designing biological heater for cell environments

Mador Technologies **2015**

$20,000 analyzing a liquid nitrogen water condensation device

Koronis Biomedical Technologies **2015**

$5,000 simulation of fluid flow

Mador Technologies **2014-2015**

$8,000 analyzing a liquid nitrogen water condensation device

National Resources Defense Council **2015**

$10k for climate education work

Medtronic **2014**
$12k for simulation of tissue temperatures during transcutaneous recharge

Smiths Medical **2014**
$9.5k for design and optimization of medical warming blankets
$10k for the design and improvement of medical fans
$12kfor the design and analysis of human thermal analogs

WTS LLC **2014-present**
$1.5m for the design of solar pasteurization systems

Medivators **2014**
$4000 for flow and pressure calculations medical chamber.
$3000 for flow and pressure calculations medical chamber.

Somnetics **2014**
$6000 for flow and pressure calculations in CPAP devices.

Lake Region Medical **2013-2014**
$4500 for simulations of a guidewire manufacturing oven

Amphora Medical **2013-2014**
$55.5k for design of RF probes for ablation of bladder tissue

ALS Consulting **2013-2014**
$17.5k for analysis of fluid flow in power plants

Medtronic, Inc. **2012-2013**
$13k for analysis of subdermal heating associated with recharge of neuromodulation systems.

Phraxis **2013**
$2,250 for the analysis of blood flow through an AV shunt

Translational Biologic Infusion Catheter **2011-2013**
$21.5k for the study of flow and pressure drop in a stem-cell delivery catheter

Advanced Circulatory Systems, Inc. **2013**
$4200 for fluid flow modeling of medical-device blowers

HRST, Inc. **2012-2015**
$11,250 for analysis of flow patterns in manifolds

Devicix **2012**
$2000 for the analysis of medical-fluid injection devices

Helical **2012-2013**
$18,200 for the design and analysis of rooftop wind turbines

QiG Group **2012**
$7000 for study of thermoelectric technologies to power implants

HRST, Inc. **2012**
$4300 for analysis of perforated plates for flow uniformity

Energy Foundation **2012-2013**
$30k developing climate-science communication strategies

CriticCare **2012**
$4,275 for numerical modeling of accelerated aging of medical devices.

HRST, Inc. **2012**
$5,540 for research study on mixing efficiency in heat recovery plants.

Windstrip, LLC **2009-2013**
$1m for development of vertical axis wind turbines to power cellular communiation equipment.

QiG Group **2011-2012**
$20k for study of implant heating of biological tissue

Phraxis **2011-2012**
$8,000 for the analysis of blood flow through an AV shunt

Energy Foundation **2011-2012**
$71k developing climate-science communication strategies

Cardiovascular Systems, Inc. **2011**
$23k for the study of paclitaxel distribution techniques.

Cardiovascular Systems, Inc. **2011**
$5,000 for the study of temperature management in palleted products

Galil Medical **2011**
$9,000 for the kidney tumor cryosurgical devices.

Multiple groups **2010**
$13,000 for installation of solar panels in Uganda

Imation
$10k for the design of a polymeric extrusion die **2010**

Cypress Wind
$30.6k for the development of a vertical axis, small-footprint wind turbine. **2010**

Cypress Wind
$27k for the development of a vertical axis, small-foorprint wind turbine. **2009**

Cardiovascular Systems, Inc. **2009**
$80k for the study of cavitation and bolus formation during orbital atherectomy procedures.

Medtronic, Inc.
$65k for analysis of subdermal heating associated with recharge of neuromodulation systems. **2008-2011**

University of St. Thomas Faculty Development Grant **2009**
$4,200 for the purchase of a high-performance computer for numerical simulations.

CSUMS: A computational Traininig and Interdisciplinary Research Program for Undergraduates in the Mathematical Sciences at the University of St. Thomas **2008-2013**
Served as Senior Personnel on a $716,836 NSF award for the development of applied research projects for undergraduates in mathematics.

Lockheed Martin Innovative Program - Advanced Cooling Technology grant **2009**
$19.5k for the improvements to avionics heat pipe applications.

Horizontal Winds **2008-2009**
$11k for research on vertical-axis wind turbines

R4 Engineering **2008-2009**
$10k for analysis of building-support insulation systems

Lockheed Martin Innovative Program - Advanced Cooling Technology grant **2007**
$53k for the development of advanced electronic-cooling methodologies.

Arizant Medical **2006**
Characterization of a forced-air patient warming device

Johnson and Johnson, Newark, NJ **2004-2005**
Analysis of a uterine fibroid embolization device

Urologix **circa 2004**
Design of thermoelectric device for heating/cooling of urological catheter fluids

Donaldson Co. **1999-2003**
Analysis and characterization of a filter-manufacturing device

Augustine Medical **2000-2003**
Characterizsation of a forced-air patient warming device

Midmac Systems Inc. **2002**
Thermal analysiss of a polymeric sealing machine

Restore Medical **circa 2002**
Characterization of sleep apnea treatment

Remmele Engineering Inc. **2002-2005**
Thermal analysis of a polymeric sealing machine for insulin packaging
Thermal analysis of liquid-based cold plates for cooling naval radar

MicroControl Company **Circa 2001**

Analysis of burn-in board devices

Jennio **circa 2001**

Analyzed devices that handle, transport, and cool turkey carcases during processing.

Caterpillar **circa 2000**

Analysis of a screed heating machine

ADC Telecom **circa 2000**

Optimization of an AC/DC power converter

Entropy Solutions **circa 2000**

Design and Analysis of insulation and phase change thermal management for shipping containers

XeteX, Inc **1996-2000**

Design of an air-to-air heat exchanger
Creation of a film processing machine for coating heat exchangers
Construction and operation of a full-sized HVAC test facility

Pneuseal **1996-1998**

Operation and optimization of a polymeric sealing device for medical packageing

Principal Investigator – Supercomputing Institute **2002-2012**

Served as PI for multi-year project dedicated to performing computational fluid dynamic studies. This grant awarded computing resources at the Supercomputing Institute for Digital Simulation and Advanced Computing.

Principal Investigator – ASHRAE Project Grant Program **2003**

Awarded a $5,000 grant funded by ASHRAE to investigate the efficacy of rotating-wheel heat and moisture exchangers.

Faculty Advisor – Bush Grant, Young Scholars Program **2002**

Faculty advisor for a $3,000 grant for undergraduate research of air-jet heat transfer for surgical applications.

Faculty Advisor – Bush Grant, Young Scholars Program **2002**

Faculty advisor for a $3,000 grant for undergraduate research to encourage American Indian students to pursue careers in science and technology.

A Multi-Function Heat Exchanger for Control of Temperature, Moisture, and Air Quality **1997-2000**

Project Engineer for $475K SBIR grants awarded by NSF, grant nos. 9660900 and 9801062