



RAM V. DEVIREDDY, Ph.D.

DeSoto Parish Chapter University Alumni Professor
Louisiana Land & Exploration Company Chair Professor
Mechanical Engineering, Louisiana State University, Baton Rouge, LA 70803
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EDUCATION

- Ph.D. University of Minnesota - Minneapolis, MN**
Department of Mechanical Engineering - 1999
Dissertation Title: Measurement of Freezing Processes in Biological Systems
- M.S. University of Colorado - Boulder, CO**
Department of Mechanical Engineering – 1995
- B.S. University of Madras - INDIA**
Mechanical Engineering - 1993

PROFESSIONAL APPOINTMENTS

- Louisiana State University – Baton Rouge, LA**
 - Professor (Courtesy): Department of Biological and Agricultural Engineering, 2021 – present
 - Professor: Department of Mechanical Engineering, 2013 – present
 - Associate Professor: Department of Mechanical Engineering, 2007 – 2013
 - Assistant Professor: Department of Mechanical Engineering, 2001 – 2007
- Yokohama National University – Yokohama, Japan** (Supported by a Japan Society for the Promotion of Science Invited Research Fellowship) Department of Chemical Engineering Science, 02/16 – 03/16
- Université Catholique de Louvain – Brussels, Belgium** (Supported by the Brussels Institute for Research and Innovation - Brains (back) to Brussels Program) Faculté de Médecine, 05/09 – 08/09
- University of Minnesota – Minneapolis, MN**
 - Post-doctoral Researcher: Department of Chemical Engineering, 06/00 – 08/01
 - Post-doctoral Researcher: Medical School, 01/00 – 08/01

RESEARCH INTERESTS

Bio-manufacturing & Design, Bio-Heat and Mass Transport, Cryobiology, Tissue Engineering, Thermo-Electric Materials & Devices, Stem Cells.

RESEARCH SUMMARY: Dr. Devireddy has a broad background in Mechanical Engineering and Bioengineering. Dr. Devireddy’s research group has long investigated the microscale phases and thermal properties of media, cells, tissues and scaffolds with application to bio-preservation and tissue engineering. His primary contributions include *developing new methods to assess the state of water during freezing in biological systems, to fabricating novel microscale bio-thermal devices and more recently, to directing osteogenic differentiation of adult stem cells using miRNAs*. The multidisciplinary breadth of his research is reflected in the diversity of his research areas, stem cell preservation, miRNA directed differentiation, 3d bioprinting, tissue freezing (experimental and numerical), mammalian and aquatic sperm cell cryopreservation, modeling of chemical diffusion at macro- and micro-scales, nano- and micro-scale heat transfer phenomena and transcriptome profiling/NGS*. Consequently, his publication record is also quite diverse and includes, engineering journals (e.g. *ASME Journal of Biomechanical Engineering*,

* List of Published Work in PubMed
Google Scholar: **(h-index: 34)**

<http://www.ncbi.nlm.nih.gov/pubmed/?term=devireddy+r>
<http://scholar.google.com/citations?user=JNKzPOwAAAAJ&hl=en>



International Journal of Heat Mass Transfer, Biotechnology and Bioengineering, Annals Biomedical Engineering, Biotechnology Progress; Scientific Reports), reproductive biology journals (e.g. *Biology of Reproduction, Molecular Reproduction and Development, Reproduction*), cryobiology journals (e.g. *Cell Preservation Technology, Cryobiology*), tissue engineering journals (e.g. *Journal of Tissue Engineering and Regenerative Medicine, Stem Cells and Development, Tissue Engineering*) and materials science journals (e.g. *Acta Materialia, Nanotechnology, Journal of Applied Physics, Applied Physics Letters, Materials Research Society proceedings; ACS Biomaterials Science & Engineering; ACS Applied Energy Materials*). The quality of his publications has been recognized by: best paper awards from the ASME Journal of Heat Transfer (2002), Mid-West Thermal Analysis Forum (1999), the Society of Cryobiology (1998), Cells (2013) and the Material Research Society (2003); cover articles for *Tissue Engineering* (2010), *Journal of Materials Chemistry* (2012); top 10 most cited articles in *Molecular Reproduction and Development* (2007). Since, joining LSU Dr. Devireddy has been funded continuously from a variety of sources including the Louisiana Board of Regents, the Whitaker Foundation, the NIH, the NSF, NASA and the LSU systems office (>\$12M Total, >\$3M PI Share). He has advised or co-advised 18 M.S., 7 Ph.D*, 5 post-doctoral scholars and served as a committee member or a Dean's representative for another 60+ students. Dr. Devireddy has received numerous honors and awards including a Brains (back) to Brussels Fellowship to visit Université Catholique de Louvain, Brussels (2009), and a Japan Society for Promotion of Science (JSPS) Fellowship to visit the Yokohama National University, Tokyo (2016). In 2012 he was inducted as a Fellow of the American Society of Mechanical Engineers (ASME)**

TEACHING SUMMARY: Dr. Devireddy has taught **eighteen different** classes, including **three new** courses, “Biological Fluid Flow and Heat Transfer”, “Principles of Tissue Engineering” and “Biological Thermodynamics”. His teaching portfolio includes seven core undergraduate courses, two undergraduate labs, five technical elective courses and four graduate courses. Dr. Devireddy’s effectiveness as a teacher is supported by consistently excellent teaching evaluations and in recognition of his teaching effectiveness, he has received numerous teaching awards including the LSU Tiger Athletic Foundation Undergraduate Teaching Award from the College of Engineering (2007 and 2011), the Dow Chemical Excellence in Teaching Award from the Department of Mechanical Engineering (2012, 2018 and 2019), the LSU Alumni Association Faculty Excellence Award (2013), the LSU Mechanical Engineering Ned Adler Teaching Award from the ASME student chapter (2017 and 2020) the Longwell Instructor Award for Excellence in the College of Engineering (2018), the LSU Distinguished Faculty Award (2021) and is routinely recognized by the graduating seniors as the most demanding Professor in the department (2007, 2008, 2010, 2011, 2014, 2015 and 2017).

TEACHING (9 UG courses, 4 Grad Courses and 5 Tech Electives)

Undergraduate Courses: Thermodynamics (for ME and non-ME students), Fluid Mechanics, Heat Transfer, Thermal Science Laboratory, Thermal Systems Laboratory, Simulation Methods, ME Capstone Design I and II, Advanced Engineering Thermodynamics and Thermal Systems Design.

Graduate Courses: Advanced Heat Transfer I (Conduction & Radiation), Advanced Heat Transfer II (Convection), Advanced Fluid Mechanics and Advanced Boundary Layer Theory.

New Courses Developed: Biological Fluid Flow & Heat Transfer, Biological Thermodynamics and Principles of Tissue Engineering.

New Research Laboratories Developed: Bio-manufacturing and Design.

As a faculty mentor in the LSU Chancellor’s Future Leaders in Research Program, Dr. Devireddy has mentored four LSU students (C.L. Duet, R. Gilmore, R. Roland and R. Baniewicz) and as part of the Louisiana Biomedical Research Network Program, he has mentored an additional four students (K. Huckaby, R. Gade, C. Lambert and G. Calderon) from other institutions of higher learning within the state of Louisiana. Dr. Devireddy has also advised over 30 senior design projects and UG research projects within the Mechanical Engineering department. One of these UG researchers (J. LaFountain) received first place oral presentation prize in the Technology & Engineering category at the 2010 annual statewide Triple Ex Undergraduate Research Symposium

*Two of which were recognized by the LSU College of Engineering Outstanding Dissertation Award.

**Fellow grade, the highest elected grade of membership in ASME. Nominated by their peers and selected by the Fellow Review Committee with final approval of the Committee of Past Presidents, these individuals have distinguished themselves in their careers.



(<http://www.i3.lsu.edu/TripleEx>) and was also a finalist at the 2011 ASME summer bioengineering conference student paper competition.

SERVICE SUMMARY: At the LSU Mechanical Engineering (ME) department, Dr. Devireddy served as the seminar series coordinator (2003-05), faculty search committee member (2003-04 & 2012-15) and chair (2016-20), graduate studies committee member (2004-2009), undergraduate studies committee member (2009-present), Chair of the Thermal/Fluid Sciences Faculty Group (2012-present), committee to revise and update the UG curriculum (2014-18), and Chair of the promotion/tenure committee (2016-present). As Chair of the Faculty Search Committee (2016-20) Dr. Devireddy was instrumental in hiring two female faculty members (Drs. Palardy and Barbalata) significantly diversifying the ME faculty. At the national level as part of the ASME society, Dr. Devireddy served as session chair and co-chair, track chair and organized multiple symposia (see full listing in “Outreach and Professional Service” section), as a Program Committee Member (2006 and 2013) for the joint ASME and Indian Society of Heat and Mass Transfer conference, acting liaison between different ASME committees (2005-2007), co-chair (2008-10) and chair (2010-12) of the ASME Biotransport committee as well as the chair of the ASME K-17 Heat Transfer Committee (2010-13), as a member of the ASME Y.C. Fung Young Investigator Awards committee (2016-2019), as an Associate Editor for the *ASME Journal of Biomechanical Engineering* (2012-19), the *ASME Journal of Heat Transfer* (2020-present) and the *ASME Open Journal of Engineering* (2021-present). In 2013, Dr. Devireddy served as the technical program chair for the ASME Summer Bioengineering Conference in Bend, OR. Dr. Devireddy currently serves on the editorial board of *Cryobiology: The International Journal of Low Temperature Medicine and Biology* (2007-present). In 2018, Dr. Devireddy served as the section editor on “*Heat Transfer in Biology and Biological Systems*” in the “*Handbook of Thermal Science and Engineering*” published by Springer. Dr. Devireddy is currently co-editing a special issue of *ASME Journal of Heat Transfer* to commemorate Prof. Ernie Cravalho on “*Heat and Mass Transfer in Biotechnology*”.

Dr. Devireddy is also an active reviewer for various funding agencies including the NSF, the USDA, the NIH, the University of California (Discovery Grant Program), the US Army Medical Research and Material Command, the Netherlands Organization of Scientific Research, the Poland National Science Center, the National Research Council of Romania, the Research Council of Norway, NSERC Canada, the Georgia National Science Foundation, Tbilisi, Georgia and the EU (H2020). Dr. Devireddy has been invited to present plenary talks at several national and international conferences, including the 56th Meeting of the Society for Low Temperature Biology (2020), the 3rd International Congress on Cryopreservation of Stem cells, Reproductive cells, Tissue and Organs, Berlin, Germany (2013), Bioprocessing Summit, Boston, MA (2011), International Stem Cell Summit, IIT, Madras, India (2008), NIH Workshop on “High Throughput Germplasm Cryopreservation”, Bethesda, MD (2007), NATO Advanced Study Institute on Low-Temperature and Cryogenic Refrigeration, Izmir, Turkey (2001) and at various academic institutions, including Kyushu University, Yokohoma National University, Royal Free Hospital (London), King’s College (London), UC (Riverside), Rutgers – the State University of New Jersey, Tulane University, Indian Institute of Technology (Madras), Institute of Technology (Benares Hindu University, Varanasi, India) and Clarkson University.

SELECTED HONORS AND AWARDS

Worley Professor of Excellence: Presented by Worley: Industrial Engineering Solutions Company and LSU’s Cox Communications Academic Center for Student-Athletes, 2022

LSU Distinguished Faculty Award: For Sustained Record of Excellence in Research & Teaching, 2021

Guest Editor: Special Issue of ASME Journal of Heat Transfer entitled *In Memoriam of Prof. Ernest G. Cravalho: Heat and Mass Transfer in Biotechnology*, 2020-21

Harry Longwell Award: College of Engineering Award for Instructor Excellence, 2018

Dow Chemical Teaching Award: Mechanical Engineering, 2012, 2018 & 2019

LSU Mechanical Engineering Ned Adler Teaching Award: ASME Student Chapter, 2017 & 2020

LSU Undergraduate Teaching Award: Tiger Athletic Foundation, 2007 & 2016

JSPS Fellowship (¥1,000,000): Invited Fellow Japan Society for Promotion of Science, 2016

LSU Mechanical Engineering Golden Screw Award: ASME student chapter most demanding professor, 2007, 2008, 2010, 2011, 2014, 2015, 2017 & 2020



Louisiana State University Alumni Professorship: DeSoto Parish Chapter Professor, 2015
LSU Faculty Excellence Award: Alumni Association Faculty Excellence Award, 2013
Best Paper Award: Cells, 2013
LSU Today: Featured Flagship Faculty, 2012
ASME Fellow: American Society of Mechanical Engineers, 01/05/2012
College of Engineering Professorship: Louisiana Land & Exploration Company Professor, 2012
Back Cover Artwork: Journals of Materials Chemistry, 2011
Cover Article: Tissue Engineering (Part C: Methods), 2010
Brains (back) to Brussels Fellowship (€10,000): Invited Research Scientist, 2009
LSU Featured Researcher: FOREVER LSU Advertisement, 2008
NIH Workshop: Invited Participant “High Throughput Germplasm Cryopreservation”, 2007
Travel Grant for Emerging Faculty: Louisiana Board of Regents, 2002 & 2005
MRS Ribbon Award: Materials Research Society (MRS) Fall Meeting, 2003
Whitaker Foundation: Biomedical Engineering Research Grant, 2003
ASME Best Paper Award: ASME Journal of Heat Transfer, 2002
McBride Award: Mid-West Thermal Analysis Forum, 1999
Crystal Award: Society of Cryobiology, Best Student Paper, 1998
Doctoral Studies Fellowship: University of Minnesota, Minneapolis, 1995 – 1996
Graduate Fellowship: University of Colorado, Boulder, 1993 – 1994
Outstanding Graduating Student: University of Madras, India, 1993

SELECTED INVITED TALKS

Invited Talk: University of Cambridge, Cambridge, UK 2022
Invited Talk: Royal Free Hospital, London, UK 2015 & 2022
Invited Talk: King’s College Hospital, London, UK 2015 & 2022
Podcast: Episode #178 of the Gifted Life Podcast (giftedlife.org)*, 2022
Invited Lecture: Canadian Stem Cell Network Workshop – Society for Low Temperature Biology, 2021
Plenary Talk: 56th Meeting of the Society for Low Temperature Biology, I³ IVFmeetingroom.com 2020
Invited Seminar: Institute of Technology, Benares Hindu University, Varanasi, India 2019
Invited Seminar: Indian Institute of Technology, Madras, India 2017
Invited Seminar: Indian Institute of Science, Bangalore, India 2017
Invited Seminar: Yokohama National University, Yokohama, Japan 2016
Invited Seminar: Kyushu University, Fukuoka, Japan 2016
Invited Speaker: INDO-US Workshop on “Nano-Engineering in Medicine”, India 2014
Invited Seminar: Institut National la Recherche Agronomique (INRA), Paris, France 2014
Invited Seminar: Tulane University - New Orleans 2013
Invited Speaker: 3rd International Congress on Controversies in Cryopreservation of Stem cells, Reproductive cells, Tissue and Organs, Berlin, Germany 2013
Invited Speaker: 4th International Conference on Drug Discovery and Therapy, Dubai 2012
Invited Speaker: Bioprocessing Summit, Boston 2011
Invited Speaker: 1st International Congress on Controversies in Cryopreservation of Stem cells, Reproductive cells, Tissue and Organs, Valencia, Spain 2010
Invited Seminar: Faculte de Medicine, Universite Catholique de Louvain, Brussels, Belgium 2009
Invited Lecture: Saturday Science @ LSU 2008
Invited Speaker: International Stem Cell Summit, India 2008
Invited Seminar: University of California, Riverside 2006
Invited Seminar: Clarkson University, Potsdam 2005

* *Show Notes:* Research that could be the biggest life-saving change for organ donation in 40 years. Released: 1/14/2022.



- Invited Seminar:** Department of Physics, Louisiana State University, 2002
Invited Seminar: RUTGERS – State University of New Jersey, New Brunswick 2004
Invited Seminar: Audubon Center for Research in Endangered Species, New Orleans 2004
Invited Seminar: Department of Animal Reproduction Sciences, Louisiana State University, 2002
Invited Speaker: NATO Advanced Study Institute on Low Temperature and Cryogenic Refrigeration, Izmir, Turkey 2002
Invited Seminar: University of New Orleans, New Orleans 2002
Invited Seminar: Massachusetts General Hospital & Harvard Medical School, Boston 1999

APPOINTMENTS AND ACTIVITIES

- Member:** American Society of Mechanical Engineers, 1998 – present
Member: Society of Cryobiology, 1998 – present
Member: Materials Research Society, 2003 – 2009
Member: American Association for Advancement of Science, 2002 – 2006

OUTREACH AND PROFESSIONAL SERVICE

- Associate Editor:** ASME Open Journal of Engineering, 2021 – present
Guest Editor: Special Issue of ASME Journal of Heat Transfer on “*Heat and Mass Transfer in Biotechnology*” to commemorate Prof. E. G. Cravalho
Associate Editor: ASME Journal of Heat Transfer, 2020 – present
Member: ASME Standards Committee on Thermal Medicine, July 2020 – June 2025
Member: ASME BED Y.C. Fung Young Investigator Award Committee, 2016 – 2019
Book Section Editor: Section on “Heat Transfer in Biology and Biological Systems” in the “Handbook of Thermal Science and Engineering” published by Springer (2018).
Technical Program Chair: ASME Summer Bioengineering Conference, 2013
Associate Editor: ASME Journal of Biomechanical Engineering, 2011 – 2019
Chair: ASME BED Biotransport Committee, 2010 – 2012
Chair: ASME HTD Heat and Mass Transfer in Biotechnology Committee, 2010 – 2013
Member: Technical Program Committee ASME Summer Bioengineering Conference, 2011 – 2012
Vice Chair: ASME BED Biotransport Committee, 2008 – 2010
Vice Chair: ASME HTD K-17 Heat and Mass Transfer in Biotechnology Committee, 2008 – 2010
Acting Liaison: ASME K-17 committee and ASME Biofluids Committee, 2005 – 2007
Acting Liaison: ASME K-17 committee and ASME Design & Rehabilitation Committee, 2005 – 2007
Editorial Board: Cryobiology: The International Journal of Low Temperature Medicine and Biology, 2007 – present
Editorial Board: Open Biotechnology Journal, 2007 – present
Editorial Board: Journal of Bioengineering and Biomedical Science, 2007 – present
Scientific Program Committee Member: ISHMT-ASME Conference, 2006 & 2013
Calendar Editor: ASME Journal of Biomechanical Engineering, 2005 – 2013
ASME Conference Session Chair:
ASME Summer Bioengineering Conference (SBC), Biopreservation, 2008
ASME IMECE Biotechnology III & IV, 2007
ASME SBC, Biological Flows and Biopreservation, 2006
ASME SBC, Computational Bioheat and Mass Transfer, 2005
ASME SBC, Thermal Therapies, 2003
ASME IMECE, Heat Transfer in Medicine & Biology - I, 2002
ASME IMECE, Heat Transfer in Medicine & Biology - II, 2002
ASME IMECE, Thermal Injury and Treatment - I, 2001
ASME IMECE, Thermal Injury and Treatment - II, 2001



ASME Conference Session Co-Chair:

ASME NEMB, BioMEMS and Biofabrication for Development of Cellular Systems, 2013
ASME NEMB, Cancer Detection and Diagnostics, 2013
ASME IMECE Biotechnology - II, 2007
ASME SBC, Thermal/Chemical Processes and Mass Transport in Biosystems, 2006
HEFAT, Mathematical Modeling of Turbines, Compressors, Intakes & Engines, 2005
HEFAT, Experimental Incompressible Flow, 2005
ASME IMECE, Thermal Aspects of Molecular Surgery, 2004

ASME Conference Track Chair:

ASME NEMB, Nano/Microfluidics in Biology and Medicine, 2013
ASME IMECE, Heat and Mass Transfer in Biotechnology, 2013
ASME SBC, Biotransport, 2012
ASME Summer Heat Transfer Conference, Bio-Heat and Mass Transfer, 2012
ASME SBC, Biotransport, 2011
World Congress on Biomechanics, Biotransport, 2010
ASME SBC, Biotransport, 2010
ASME IMECE, Heat and Mass Transfer in Biotechnology, 2010

ASME Conference Track Co-Chair:

ASME Summer Heat Transfer Conference, Nano Thermal Medicine, 2013
ASME IMECE, Biomedical and Biotechnology, 2012
ASME IMECE, Biomedical and Biotechnology, 2011
ASME SBC, Biotransport, 2009
ASME IMECE, Heat and Mass Transfer in Biotechnology, 2009
ASME Summer Bioengineering Conference, Biotransport, 2008
ASME IMECE, Heat and Mass Transfer in Biotechnology, 2008
ASME SBC, Thermal/Chemical Processes and Mass Transport in Biosystems, 2006

Symposium/Workshop Chair:

ASME SBC, Tour of Commercial Manufacturing Plants in Puerto Rico, 2012
ASME SBC, Prof. John Chato Memorial, 2011
ASME SBC, Biotransport Education, 2011
HEFAT, Mathematical Modeling of Turbines, Compressors, Intakes & Engines, 2005
ASME IMECE, Thermal Aspects of Molecular Surgery, 2004

Judge: ASME SBC, Student Poster Competition, 2008 – 2012

ASME NEMB, Student Poster Competition, 2015

Journal Peer Reviewer: American Journal of Transplantation, AIChE J, Annals of Biomedical Engineering, Asian Journal of Andrology, ASME Journal of Biomechanical Engineering, ASME Journal of Heat Transfer, ASME Journal of Medical Devices, ASME Journal of Electronic Packaging, Biology of Reproduction, Biopreservation and Biobanking, Biotechnology Progress, Cell Preservation Technology, Chemistry of Materials, Cryobiology, Cryo-Letters, Fertility and Sterility, Human Reproduction, IEEE Transactions on Biomedical Engineering, International Journal of Heat and Mass Transfer, International Journal of Power and Energy Systems, Journal of Aquatic Ecology, Journal of Biological Physics, Journal of Burn Care and Rehabilitation, Lab on a Chip, Lasers in Surgery and Medicine, Macromolecular Bioscience, Molecular Reproduction and Development, Medical Engineering and Physics, Physics in Medicine and Biology, PLOS One, Reproduction, Scientific Reports, Sensors and Actuators B: Chemical, Surgical Oncology, Theriogenology, Thermochemica Acta, Veterinary Surgery, Yonsei Medical Journal.

Review Panels:

National Institutes of Health (multiple panels), 2009 – present

NIH Panel ZRG1 EMNR-L & ZRG1 EMNRC (2009); NIH Mail-in Reviewer, ZRG1 EMNRC (2009); NIH Temporary Member, Comparative Medicine Review Committee RIRG C (2011); NIH Mail-in Reviewer, ZRG1 IMST-12 (2011, 2012, 2013); NIH Panel IMST-J 15 (2013, 2014; 2015; 2016); NIH Panel Member, EMBR-W 10 (2015); NIH Mail-in Reviewer ZRG1 IMST-K 14 (2015); NIH ZRG1 IMST-V 15 (2016); NIH ZRG1 ETTND (02) (2017); NIH ZRG1 IMST-K (30) (2017); NIH ZRG1 IMST-H (15) B (2016, 2017, 2018 & 2019); NIH ZRG1



IMST-H (02) M (2019); NIH ZRG1 DKUS-R10 (2020); NIH ZRG1 EMNR-D (11) B (2021); NIH ZRG1 EMNR-K(11) (2022).

Brockhouse Prize, Canada, 2019 and 2020

National Science Foundation (over 20 panels), 2010 – present

H2020 European Commission (over 15 panels), 2014 – 2020

National Science Center, Poland, 2016

Research Council of Norway, 2015

University of California, Discovery Grant and Proof of Concept program, 2011 & 2013

National Research Council Romania, 2012

National Sciences and Engineering Research Council, (NSERC) Canada, 2006, 2008, 2010, 2011, 2018, 2019 and 2020

US Armed Medical Research & Material Command, 2007, 2009, 2010 & 2011

Georgia National Science Foundation, 2008 & 2009

University of Missouri, Internal Seed Grant Program, 2003 & 2007

Netherlands Organization of Scientific Research, 2003

USDA, National Research Initiative Competitive Grants Program, 2003

External Reviewer: Reference/Tenure/Promotion/Professorship letters for colleagues at Virginia Tech, Tulane University, University of Kansas, Northeastern University, North Carolina State University, Ohio State University, Purdue University, Colorado State University, University of Minnesota, University of Washington, University of Texas at Austin, Iowa State University, Clarkson University, University of Michigan, University of Florida, University of South Carolina, University of Texas at Dallas, University of Massachusetts, University of Alberta, University of Georgia, Georgetown University, University of Arizona, Oregon State University, Pennsylvania State University, Wright State University, Utah State University, University of Binghamton, Worcester Polytechnic University, San Diego State University, Howard University, State University of New York, Xavier University of Louisiana, California State University, University of Toronto, Jordan University of Science and Technology, Indian Institute of Technology and Federal University of Sao Paulo, Brazil; 2011 – present.

LSU INTERNAL SERVICE AND DIVERSITY INITIATIVES

Promotion and Tenure Committee Member: College of Engineering, 2019 – present

Chair, Promotion and Tenure Committee: Department of Mechanical Engineering, 2019 – 2020

Faculty Search Committee Chair: Computational Mechanics and Biotechnology Faculty Search, Department of Mechanical Engineering, 2021 – 2022 (Hired: Dr. Kshitiz Upadhyay)

Faculty Search Committee Chair: Energy and Advanced Manufacturing Faculty Search, Department of Mechanical Engineering, 2019 – 2021 (Hired: Dr. Chris Marvel and Dr. Ope Owoyele)

Faculty Search Committee Chair: Robotics Faculty Search, Department of Mechanical Engineering, 2017 – 2019 (Hired: Dr. Corina Barbalata)

Thermal-Fluid Science Faculty Group Leader: Mechanical Engineering, 2012 – present

Faculty Search Committee Member:

- Biomechanics, Department of Biological & Agricultural Engineering, 2017 – 2018 (Hired: Dr. Kevin Hoffseth)
- Composite Materials, Department of Mechanical Engineering, 2016 – 2017 (Hired: Dr. Genevieve Palardy)
- Nuclear Engineering and Science, Department of Mechanical Engineering, 2012 – 2015 (Hired: Dr. Fengyuan Lu and Dr. Manas Gartia)
- Biotechnology Initiative, Department of Mechanical Engineering, 2003 – 2004 (Hired: Dr. Sunggook Park)

Committee Member:

- Promotion & Tenure Committee, Mechanical Engineering, 2013 – present
- Undergraduate Studies Committee, Mechanical Engineering, 2009 – present
- Mechanical Engineering Undergraduate Curriculum Revision & Advancement Committee, 2014 – 2018
- Mechanical Engineering, Western European Outreach Ambassador, 2013 – 2018



Université Claude Bernard Lyon 1, France, 2013 – 2018
Politecnico di Torino, Italy, 2013

- College of Engineering Policy Committee, 2015 – 2017
- LSU Faculty Senate Internationalization Committee, 2014 – 2015
- LSU PS-69 Ethics Investigative Committee, 2010
- Mechanical Engineering, Graduate Studies Committee, 2004 – 2009
- Office of Academic Affairs, University-Wide Faculty Awards Committee, 2022

Institutional Co-Ordinator: Louisiana Space Consortium (LaSPACE) programs, 2014 – 2018

Judge: Annual Phi Zeta Research Day - LSU School of Veterinary Medicine, 2005 – 2013

Keynote Presentation: Louisiana Junior Science and Humanities Symposium, 2013

Participant: CxC (Communication across the Curriculum) Faculty Summer Institute, 2013

Faculty Development Program Participant: Eng² Project, 2012 & 2013

Departmental Seminar Co-ordinator: Mechanical Engineering, 2003 – 2005

LSU SUPPLEMENTAL INSTRUCTIONAL ACTIVITIES

New Laboratory Manuals:

Thermal-Fluid Science Experiments, 2015: Internal Combustion Engine; Heating, Ventilation and Air Conditioning Experiment; Rankine Power Cycle

Faculty Mentor:

Howard Hughes Medical Institute Program, 2005 – 2007 (D. Henderson)

Chancellor's Future Leaders in Research Program, 2002 – present (C.L. Duet, R. Gilmore, R. Roland, R. Baniewicz, J. Carriere, K. Lambert, K. Edwards, R. Warne, L. StPe, E. Duckworth, J. Bohnet)

Faculty Advisor:

Louisiana Biomedical Research Network Program, 2004 – 2011 (K. Huckaby, R. Gade, C. Lambert, G. Calderon)
Special Projects for Graduate Students, 2011 (A. Zanetti, DVM MVSc)

Louisiana Alliance for Simulation-Guided Materials Applications Research Experience for Undergraduate (REU) Program, 2012 – 2015 (A. Reed, E. Joshi)

LSU Distinguished Communicator Students, 2012 – present (K. Clement, K. Louth, B. Travis, R. Hedges, G. Carrier, A. Stokes)

ME 3903 – Special Projects for Undergraduates 2010 – present (J. LaFountain*, F. Breeden, S. Linares, K. Louth)

LSU ME UG Honors Thesis Committee Member: 2015 – 2016 (K. Carr)

Course Instructor for Senior Design Projects in Mechanical Engineering as *listed below*

Vibration Analysis of Rotating Equipment Lab (2020 – 21) **Ben Burns Jr. Memorial Best Project Award**

Icarus Core-Burning (CB) 2 Rocket Glider (2020 – 21)

12lb Combat Robot “Flippity Floppity” (2020 – 21) **Bengal Bot Rumble Winner**

Device to Load/Unload Material on Waterjet (2020 – 21)

Modify Rock Box Trash Collection System (2020 – 21)

Wall Mounted Foldable Toilet Support (2020 – 21)

Running Blind – Running Aid for a Person who is Blind or Visually Impaired (2022 – 23)

Design and Fabrication of Chambers for Cyclic Fatigue Testing (2022 – 23)

Essem 3 (2022 – 23)

Harden Doors in Patrick Taylor Hall (2022 – 23)

Hub Motor Integration for a Formula SAE Vehicle (2022 – 23)

Designs for a Minimal Impact Dual Access Faceplate and Smart Tie to Reduce the Risk of Tracheostomy Related Wound Complications in Children (2022 – 23)

Hydraulic Boat Race (2022 – 23)

*First place oral presentation prize in the Technology & Engineering category at the 2010 annual statewide Triple Ex Undergraduate Research Symposium (<http://www.i3.lsu.edu/TripleEx>).



Faculty Advisor for Senior Design Projects in Mechanical Engineering as *listed below*

Silo Lump Crusher (2021– 22)
Modular, Rapidly Deployed Flood Barrier (2021– 22)
Solar+Storage Shingle Design (2021– 22)
Hydraulic Bicycle Design (2020 – 21).
SAE Aero Design – Advanced Class Model Airplane (2020 – 21)
Drone Payload System (2019 – 20)
InstaCooler (2019 – 20)
Aircraft Refrigeration Compressor (2019 – 20)
John Deere Sugarcane Harvester (2019-20)
SAE Aero Design – Advanced Class Model Airplane (2018 – 19)
Freeze Plug Development Analysis (2018-19)
Mechanical Cleaning Pig that Avoids Pipeline Plugging (2018-19)
“Chandlers” NASA Human Exploration Rover Challenge (2018-19)
3D Printed Micro-Reactor (2017 – 18)
SAE Aero Design – Advanced Class Model Airplane (2017 – 18)
Prevention of Crush Injuries from Motorized Aerial Lift Equipment (2017 – 18)
Sump Debris Removal (2016 – 2017)
Lightweight Automated Canned Pet Food Dispenser (2015 – 2016)
The Perfect Crawfish? (2015 – 2016)
A Closed-Loop, Low-Speed Wind-Tunnel for the ME Thermal Science Lab (2015 – 2016)
Reclaim Hopper Dust Control (X2) and Water Tank Fill Control (2015 – 2016)
Mechanical Operation of the FMC Choke Throttle Valve (2014 – 2015)
Auto Range Hood (2014 – 2015)
Dust Suppression Hopper Installation (2014 – 2015)
Mechanical Operation of the FMC Choke Throttle Valve (2014 – 2015)
Dual System: Clean Water and Power (2013 – 2014)
Adjustable Stereographic Microscope Stand (2013 – 2014)
Challenges to Subsea Systems due to Marine Growth and Calcification (2012 – 2013)
Design and Construction of a Cost Effective Net Zero HVAC System for a Residential Application in South Louisiana (2012 – 2013)
Biodiesel Education and Engagement Program (2012 – 2013)
Portable Cryostorage System (2011 – 2012)
A Walk on the Beach: Therapeutic? (2005 – 2006)
REDHANDED: Assault Alert/Marking System (2004 – 2005)
Continuous Acoustic Wave Flow Meter Test Stand (2003 – 2004)

Professional Meetings, Symposia and Conferences on Teaching

2021 & 2022 REFRESH: New Energy for Teaching Seminar & Workshop – Sponsored by the LSU Learning and Teaching Collaborative and Campus Federal – Aug 20th 2021 & Aug 19th 2022
2012 LSU Faculty Colloquium – Sponsored by the Office of Academic Affairs and the LSU retention committee – Jan 10th 2012
Eng² Project Faculty Development Program – Sponsored by the LSU College of Engineering – May 28th to 30th 2007
Teaching in Higher Education (THE) Forum – Sponsored by The Office of Academic Affairs and The Centers For Excellence in Learning and Teaching – Lod Cook Conference Center, LSU – April 21st to 23rd 2002; April 27th to 29th 2003; April 18th to 20th 2004

**RESEARCH FUNDING - EXTERNAL GRANTS (>\$20M Total, >\$3.5M PI Share)**

National Institutes of Health – Research Grants

- **1R15-GM141653**: Fast Freezing Processes in Tissues, 2021 – 2024, \$432K (**PI**, 100% F&A project credit).
- **1R01-DE24790-01**: Spatiotemporal Modulation of Osteogenesis in a 3-D Stromal/Stem Cell Model, 2015 – 2020, \$1,783K (**Co-PI**, 35% F&A project credit).
- **1R21-DK091852-02**: Assessing a Novel Paradigm of Inducing Cryotolerance, 2012 – 2014, \$370K, (**PI**, 100% F&A project credit)
- **5R03EB005985-02**: Ice Nucleation in Biological Tissues – Implications to Cryopreservation, 2006 – 2008, \$147K, (**PI**, 100% F&A project credit)

National Science Foundation – Research Grants

- **EPS-1003897**: Louisiana Alliance for Simulation-Guided Materials Applications: Leveraging Next Generation Supercomputing for the Study of Complex Multiscale Phenomena in Materials, 2010 – 2015, \$20,000K (\$9,123K at LSU; **Co-PI**, 4% F&A project credit)
- Towards Petascale Computing of Transport Processes in Biological Systems, 2007 – 2010, \$1,000K (\$523K at LSU; **Co-PI**, 30% F&A project credit)

The Brussels Institute for Research and Innovation - Brains (back) to Brussels Program

- Human Ovarian Tissue Freezing, 2009, \$22K (**PI**)

Whitaker Foundation – Biomedical Engineering Research Grant

- Rational Design of *Macaca Mulatta* Ovarian Tissue Cryopreservation Protocols, 2003 – 2006, \$231K (**PI**, 100% F&A project credit)

NASA – STTR Proposal

- Non-Intrusive Continuous Wave Acoustic Flowmeter, 2003 – 2004, \$100K (\$25K at LSU; **Co-PI**, 100% F&A project credit)

National Institutes of Health – Education/Conference Grants

- Summer Bioengineering Conference, 2013 – 2014, \$10K (**Co-PI**)

National Science Foundation – Education/Conference Grants

- Summer Bioengineering Conference, 2013 – 2014, \$20K (**Co-PI**)
- NEMB 2013: Nano-/Microfluidics in Biology and Medicine: Analysis, Diagnostics and Therapeutics, 2013, \$6K (**PI**)
- Symposium: Prof. John Chato Memorial Symposium on Progress and Challenges in Biotransport at 2011 Summer Bioengineering Conference in Farmington, Pennsylvania, 2011, \$9K (**PI**)
- Workshop on Biotransport Education during Summer Bioengineering Conferences, 2011 – 2013, \$18K (**Co-PI**)

Participating Member – Clinical Nutrition Research Unit (CNRU) at the Pennington

- Biomedical Research Center (PBRC), LSU. The CNRU {Center Grant # 1P30 DK072476} is funded by the National Institutes of Diabetes and Digestive and Kidney Diseases (NIDDK), of the National Institutes of Health (PI: E. Ravussin), \$5,500K

INTERNAL (LOUISIANA/LSU) COMPETITIVE GRANTS

Louisiana State Board of Regents Traditional Enhancement Program

- High-Resolution Raman System for Multidisciplinary Research at LSU, 2017 – 2018, \$166K (**Co-PI**)
- Learn by Doing – Additive Manufacturing Protocol, 2015 – 2016, \$195K (**Co-PI**)
- Biocompatible Coating (Parylene) - Deposition System, 2006 – 2007, \$100K (**Co-PI**)
- Imaging Based Diagnostic Systems for Micro/Nano Research, 2005 – 2006, \$81K (**Co-PI**)
- Enhancement of Mammalian Cell Culture Facilities at LSU-BR, 2005 – 2006, \$90K (**PI**)
- Integration of Biomechanics into Equine and Comparative Biomedical and Orthopedic Research, 2004 – 2005, \$170K (**Co-PI**)
- An Infra-Red Thermography System for Mechanical Engineering Research and Education, 2003 – 2004, \$39K (**Co-PI**)



Louisiana State University Leveraging Innovative Technology Grant Program

- Freezing Storage of Liposuction Aspirate Tissue for Regenerative Medicine Applications, 2018, \$36.5K (PI)
- LSU NSF I-Corps Site Program, 2018, \$3K (PI)

Audubon Center for Research in Endangered Species (ACRES) – LSU System Proposals

- Designing Cryopreservation Protocols for Feline Sperm, 2016 – 2017, \$47K (PI)
- An Ultra-Rapid Freezing Technique Utilizing Lasers and Liquid Nitrogen: A Proof of Concept Study, 2014 – 2015, \$53K (PI)
- Assessing the Impact of the Warming Rate on Post Freeze-thaw Functionality of Oocytes, 2011 – 2012, \$58K (PI)
- Reverse Engineering the Cryopreservation Protocols for Heterogeneous Ovarian Tissue Section, 2010 – 2011, \$100K (PI)
- Biophysics of Freezing Feline Sperm, 2009 – 2010, \$85K (PI)
- Sensitivity of Spermatozoa from Mice of Different Strains to Cryopreservation, 2008 – 2009, \$28K (Co-PI)
- Vitrification of Sperm Cells from Endangered Species, 2007, \$19K (PI)

LSU Economic Development Fellowship

- Louisiana Initiative For Engineered Preservation Of Reproductive Tissue (LIFE PORT), 2011 – 2015, (Student: H. Chinnasami), \$100K (PI)
- Microfabricated Arrays of Thermoelectric Sensors and Actuators 2005 – 2009 (Student: D. Pinisetty), \$100K (PI)
- Fundamental Cryobiology of Human Adipose Tissue Derived Adult Stem Cells, 2004 – 2007, (Student: S. Thirumala), \$75K (PI)

Louisiana State University Faculty Research Grant Program

- Cryobiology of Adult Stem Cells in the Presence of Nanoparticles, 2007 – 2008, \$10K (PI)
- *In Vitro* Assessment of Cryopreserved Ovarian Tissues – Impact of a Novel Freezing Procedure, 2005 – 2006, \$10K (PI)
- Vitrification as an Alternative Process to Cryopreservation of Genetic Material, 2004, \$10K (PI)

Louisiana State University Council on Research Summer Stipend Program

- Microscale Heat Transfer in Biological Systems During Phase Change, 2007, \$5K (PI)
- Modeling of Loading and Unloading of Cryoprotective Agents in Native Biological Tissues and Engineered Tissue-Equivalents, 2002, \$5K (PI)

Louisiana State Board of Regents Support Fund

- Conservation of Endangered Species using Sperm Freezing, 2002 – 2005, \$128K (PI)

SCIENTIFIC CONTRIBUTIONS (*>90 Archival Journal Publications & >110 Conference Proceedings & Abstracts*)

List of Published Work in PubMed:

<http://www.ncbi.nlm.nih.gov/pubmed/?term=devireddy+r>

Google Scholar:

<http://scholar.google.com/citations?user=JNKzPOwAAAAJ&hl=en>
(h-index: 34)

My early publications from my doctoral thesis focused on the development and use of a differential scanning calorimetry (DSC) technique to **measure the state of intra- and extra-cellular water during freezing of cells and tissues**. By tracking the biophysical cellular events during freezing, we hope to gain a greater insight into and control over freezing events in cells and tissues to achieve a particular viability outcome. This work has direct implications to **optimization of cryopreservation protocols** for reproductive cells and tissues and to conservation of endangered species as well as cryo-destruction of tumorous tissue.

1. Measurement of Water Transport During Freezing in Cell Suspensions using a Differential Scanning Calorimeter. R.V. Devireddy, D. Raha, and J.C. Bischof. *Cryobiology*, 36: 124-155 (1998).

2. Measurement of Water Transport During Freezing in Mammalian Liver Tissue - Part II: The Use of Differential Scanning Calorimetry. R.V. Devireddy, and J.C. Bischof. *ASME Journal of Biomechanical Engineering*, 120: 559-569 (1998).
3. Biophysics of Freezing in Liver of Freeze-Tolerant Wood Frog. P.R. Barratt, R.V. Devireddy, K.B. Storey, and J.C. Bischof. *Annals of New York Academy of Sciences*, 858: 284-297 (1998).
4. Mass Transfer During Freezing in Rat Prostate Tumor Tissue. R.V. Devireddy, D.J. Smith, and J.C. Bischof. *AIChE Journal*, 45: 639-654 (1999).
5. Liver Freezing Response of the Freeze Tolerant Wood Frog, *Rana Sylvatica*, in the Presence and Absence of Glucose. I. Experimental Measurements. R.V. Devireddy, P.R. Barratt, K.B. Storey, and J.C. Bischof. *Cryobiology*, 38: 310-326 (1999).
6. Liver Freezing Response of the Freeze Tolerant Wood Frog, *Rana Sylvatica*, in the Presence and Absence of Glucose. II. Mathematical Modeling. R.V. Devireddy, P.R. Barratt, K.B. Storey, and J.C. Bischof. *Cryobiology*, 38: 327-338 (1999)
7. Sub-zero Water Permeability Parameters of Mouse Spermatozoa in the Presence of Extracellular Ice and Cryoprotective Agents. R.V. Devireddy, D.J. Swanlund, K.P. Roberts, and J.C. Bischof. *Biology of Reproduction*, 61: 764-775 (1999).
8. The Effect of Extracellular Ice and Cryoprotective Agents on the Water Permeability Parameters of Human Sperm Plasma Membrane During Freezing. R.V. Devireddy, D.J. Swanlund, K.P. Roberts, J.L. Pryor, and J.C. Bischof. *Human Reproduction*, 15: 1125-1135 (2000).
9. Microscopic and Calorimetric Assessment of Freezing Processes in Uterine Fibroid Tissue. R.V. Devireddy, J.E. Coad, and J.C. Bischof. *Cryobiology*, 42: 225-243 (2001).
10. Measured Effect of Collection and Cooling Conditions on the Motility and the Water Transport Parameters at Subzero Temperatures of Equine Spermatozoa. R.V. Devireddy, D.J. Swanlund, A.S. Alghamdi, L.A. Duoos, M.H.T. Troedsson, J.C. Bischof, and K.P. Roberts. *Reproduction*, 124: 643-648 (2002).
11. Cryopreservation of Equine Spermatozoa: Optimal Cooling Rates in the Presence and Absence of Cryoprotective Agents. R.V. Devireddy, T. Olin, D.J. Swanlund, W. Vincente, M.H.T. Troedsson, J.C. Bischof, and K.P. Roberts. *Biology of Reproduction*, 66: 222-231 (2002).
12. Cryopreservation of Canine Spermatozoa: Theoretical Prediction of Optimal Cooling Rates in the Presence and Absence of Cryoprotective Agents. S. Thirumala, M.S. Ferrer, A. Al-Jarrah, B.E. Eilts, D.L. Paccamonti, and R.V. Devireddy. *Cryobiology*, 47: 109-124 (2003).
13. Recent Advances in Cryobiology Using Calorimetry. R.V. Devireddy and J. C. Bischof. In: "*Low Temperature and Cryogenic Refrigeration*", edited by S. Kakaç, H.F. Smirnov and M.R. Avelino, Kluwer Academic Publishers, Dordrecht, The Netherlands. pp. 265-294 (2003).
14. Variation in the Membrane Transport Properties and Predicted Optimal Rates of Freezing for Spermatozoa of Diploid and Tetraploid Pacific Oyster *Crassostrea Gigas*. Y. He, Q. Dong, T.R. Tiersch and R.V. Devireddy. *Biology of Reproduction*, 70: 1428-1437 (2004).
15. Subzero Water Transport Characteristics of Boar Spermatozoa Confirm Observed Optimal Cooling Rates. R.V. Devireddy, B. Fahrig, R.A. Godke and S.P. Leibo. *Molecular Reproduction and Development*, 67: 446-457 (2004).
16. A Theoretically Estimated Optimal Cooling Rate For the Cryopreservation of Sperm Cells From A Live-bearing Fish, The Green Swordtail *Xiphophorus helleri*. S. Thirumala, C. Huang, Q. Dong, T.R. Tiersch and R.V. Devireddy. *Theriogenology*, 63: 2395-2415 (2005).
17. Subzero Water Permeability Parameters and Optimal Freezing Rates for Sperm Cells of the Southern Platyfish, *Xiphophorus maculatus*. D. Pinisetty, C. Huang, Q. Dong, T.R. Tiersch and R.V. Devireddy. *Cryobiology*, 50: 250-263 (2005).
18. Effect of Cholesterol-Loaded Cyclodextrin on Freezing Induced Water Loss in Bovine Sperm. G. Li, J. Saenz, R. Godke and R.V. Devireddy. *Reproduction*, 131: 875-886 (2006).
19. Freezing Response and Optimal Cooling Rates for Cryopreserving Sperm Cells of Striped Bass, *Morone saxatilis*. S. Thirumala, W.T. Campbell, M.R. Vicknair, T.R. Tiersch and R.V. Devireddy. *Theriogenology*, 66: 964-973 (2006).

20. Freezing Response of White Bass (*Morone chrysops*) Sperm Cells. R.V. Devireddy, W.T. Campbell, J.T. Buchanan and T.R. Tiersch. *Cryobiology*, 52: 440-445 (2006).
21. Freezing Characteristics of Ejaculated and Epididymal Rhesus Monkey (*Macaca Mulatta*) Sperm. R. Alapati, K. Goff, M-H. Kubisch, and R.V. Devireddy. *Cryobiology*, 57: 182-185 (2008).
22. Comparison of the Permeability Properties and Post-Thaw Motility of Ejaculated and Epididymal Bovine Spermatozoa. R. Alapati, M. Stout, J. Saenz, G.T. Gentry Jr, R.A. Godke and R.V. Devireddy. *Cryobiology*, 59: 164-170 (2009).
23. Cellular Biophysics During Freezing of Rat and Mouse Sperm Predicts Post-Thaw Motility. M. Hagiwara, J-H Choi, R. V Devireddy, K. P. Roberts, W. F Wolkers, A. Makhlof, and J. C Bischof. *Biology of Reproduction*, 81: 700-706 (2009).
24. The Use of Calorimetry for Subzero Cryobiological Measurements. R.V. Devireddy. In: “*Cryopreservation in Aquatic Species, 2nd Edition*”, edited by T.R. Tiersch and P.M. Mazik, World Aquaculture Society, Baton Rouge, LA. pp. 325-335 (2011).
25. Calorimetric Measurement of Water Transport and Intracellular Ice Formation During Freezing in Cell Suspension. S. Mori, J. Choi, R.V. Devireddy, J. C. Bischof. *Cryobiology*, 65:242-255 (2012).
26. *Invited Review Article*: Biopreservation: Heat/Mass Transfer Challenges and Biochemical/Genetic Adaptations in Biological Systems. R.V. Devireddy. *Heat Transfer Research*, 44:245-272 (2013).
27. Heat and Mass Transfer Models and Measurements for Low Temperature Storage of Biological Systems. S. Shaik and R.V. Devireddy. In: “*The Handbook of Thermal Science and Engineering*”, edited by F. Kulacki. Springer International Publishing. DOI:10.1007/978-3-319-32003-8_73-1. (2018)

In addition to the contributions described above, with a team of collaborators from the Audubon Center for Research in Endangered Species in New Orleans and with colleagues at the Faculté de Médecine, Université Catholique de Louvain (UCL), I studied the **effects of various supra-zero collection and transportation conditions on the subzero (freezing) response of ovarian tissues**. Our research has demonstrated, for the first time, the interplay between the imposed thermal history at suprazero (above zero) degrees with the cellular damage during consequent cooling at sub-zero temperatures. The goal of our research was to restore ovarian endocrine function so as to prevent deleterious consequences of premature menopause, and to significantly improve the quality of life for female patients recovering from traditional cancer therapies.

28. Suprazero Cooling Conditions Significantly Influence Subzero Permeability Parameters of Mammalian Ovarian Tissue. R.V. Devireddy, G. Li and S.P. Leibo. *Molecular Reproduction & Development*, 73: 330-341 (2006).
29. Freezing Response of Equine and Macaque Ovarian Tissue in Mixtures of Dimethylsulfoxide and Ethylene Glycol. A. Kardak, S.P. Leibo and R.V. Devireddy. *ASME Journal of Biomechanical Engineering*, 129:688-694 (2007).
30. Subzero Water Transport Characteristics and Optimal Rates of Freezing *Macaca mulatta* (Rhesus Monkey) Ovarian Tissue. G. Li, S. Thirumala, S.P. Leibo and R.V. Devireddy. *Molecular Reproduction & Development*, 73: 1600-1611 (2006).
31. Successful Vitrification and Autografting of Baboon (*Papio anubis*) Ovarian Tissue. C.A. Amorim, S. Jacobs, R.V. Devireddy, A. van Langendonck, J. Vanacker, J. Jaeger, J. Luyckx and J. Donnez. *Human Reproduction*. 28:2146-2156 (2013).
32. *Invited Review Article*: Cryobiology of Ovarian Tissues: Known Knowns and Known Unknowns. R.V. Devireddy. *Special issue of Minerva Ginecologica*. 70: 387-401 (2018).

To further our understanding of mass transfer processes in tissues, we have developed a **macroscopic mathematical model to simulate the coupled solute (CPA) and solvent (water) transport** in arbitrary tissue sections. The model accounts for the diffusion of the solute as well as axial convection and the movement of the solvent to and from the extracellular spaces. Separately and in collaboration with my colleague, Dr. Moldovan, our group has also initiated **micro-scale atomistic (molecular dynamic) simulation studies** of CPAs interacting with biomembranes. Our atomistic simulations, showed for the first time, the nucleation and growth of hydrophilic pores in biomembranes exposed to CPAs.

33. Effect of Microscale Mass Transport and Phase Change on Numerical Prediction of Freezing in Biological Tissues. R.V. Devireddy, D.J. Smith, and J.C. Bischof. *ASME Journal of Heat Transfer* {Special Issue on Micro/Nano Scale Heat and Mass Transfer}, 124: 365-374 (2002). **Best paper award.**
34. Measurement and Numerical Analysis of Freezing in Solutions Enclosed in a Small Container. R.V. Devireddy, P.H. Leo, J.S. Lowengrub, and J.C. Bischof. *International Journal of Heat and Mass Transfer*, 45: 1915-1931 (2002).
35. Determination of Solute and Solvent Permeability Parameters in Artificial Tissue Sections: An Inverse Approach. Y. He and R.V. Devireddy. In: *Biomaterials for Tissue Engineering*, edited by J.Y. Wong, A.L. Plant, C.E. Schmidt, L. Shea, A.J. Coury and C.S. Chen. *Mater. Res. Soc. Symp. Proc.* Vol. EXS-1, Warrendale, PA. Paper number. F8.20 (2003).
36. Cryopreservation of Collagen-Based Tissue-Equivalents - Part I: Effect of Freezing in the Absence of Cryoprotective Agents. R.V. Devireddy, M.R. Neidert, J.C. Bischof, and R.T. Tranquillo. *Tissue Engineering*, 9: 1089-1100 (2003).
37. Cryopreservation of Collagen-Based Tissue-Equivalents - Part II: Improved Freezing in the Presence of Cryoprotective Agents. M.R. Neidert, R.V. Devireddy, R.T. Tranquillo, and J.C. Bischof. *Tissue Engineering*, 10: 23-32 (2004).
38. An Inverse Approach to Determine the Permeability of Cryoprotective Agents and Water in Artificial Tissues. Y. He and R.V. Devireddy. *Annals of Biomedical Engineering*, 33: 709-718 (2005).
39. Predicted Permeability Parameters of Human Ovarian Tissue Cells to Various Cryoprotectants and Water. R.V. Devireddy. *Molecular Reproduction & Development*, 70: 333-343 (2005).
40. Permeability Characteristics of Ovine Primordial Follicles Calculated with Two Parameter Kedem-Katchalsky Formulation. R.V. Devireddy, C.A. Amorim and S.P. Leibo. *Cell Preservation Technology*, 4: 188-198 (2006).
41. The Effect of Methanol on Lipid Bilayers: An Atomistic Investigation. D. Pinisetty, D. Moldovan and R.V. Devireddy. *Annals of Biomedical Engineering*, 34: 1442-1451 (2006).
42. Molecular Dynamics Simulation of Pore Growth in Lipid Bilayer Membranes in the Presence of Edge-Active Agents. D. Moldovan, D. Pinisetty and R.V. Devireddy. *Applied Physics Letters*, 91: 204104 (2007).
43. *Invited Review Article*: Statistical Thermodynamics of Biomembranes. R.V. Devireddy. *Cryobiology*, 60: 80-90 (2010).
44. A Molecular Dynamics Study of DMPC Lipid Bilayers Interacting with Dimethylsulfoxide-Water Mixtures. D. Pinisetty, R. Alapati and R.V. Devireddy. *Journal of Membrane Biology*, 245: 807-814 (2012).
45. Freezing of Solute-Laden Aqueous Solutions: Kinetics of Crystallization, Heat- & Mass-Transfer-Limited Model. S. Johnson, C. Hall, S. Das and R.V. Devireddy. *Bioengineering*, 9: 540 (2022).

We have also initiated studies to **develop, characterize and fabricate microscale devices to measure and control temperatures** at the cellular level in isolated cells and embedded tissue cells. To this end, we have developed a nano-scale heat transfer model to assess the thermal conductivity of a Bi₂Te₃ (semiconductor)/Sb (semimetal) superlattice nanostructures (either nanowires or nanotubes). In a separate study, we modeled the thermal behavior of a device consisting of an array of micro thermoelectric coolers for highly localized control of temperature in biological systems. Our analysis revealed the presence of a new limitation on the maximum possible current through the system, which we denoted as the secondary breakdown current, as opposed to the primary breakdown current associated with Joules heating.

46. Electrodeposition Characteristics of Bismuth-Telluride Films. A. Prabhakar, E.J. Podlaha-Murphy, M.C. Murphy and R.V. Devireddy. In: *Nanoscale Materials Science in Biology and Medicine*, edited by C. T. Laurencin and E. A. Botchwey. *Mater. Res. Soc. Symp. Proc.* Vol. 845, Warrendale, PA. Paper # AA5.25 (2004).
47. Electrolyte Effect on Nanotube Properties. D. Davis, D. Pinisetty, M. Moldovan, A. Prabhakar, D. Young, R.V. Devireddy, M.C. Murphy, and E.J. Podlaha-Murphy. *ECS Transactions*, 6:253-260 (2007).
48. Modeling of a Bio-Thermo-Electric Micro-Cooler. A. Prabhakar, M.C. Murphy and R.V. Devireddy. *Open Biotechnology Journal*, 1:1-8 (2007).

49. Numerical Simulation of Local Temperature Distortions during Ice Nucleation of Cells in Suspension. D. Kandra and R.V. Devireddy. *International Journal of Heat and Mass Transfer*, 51: 5655-5661 (2008).
50. Thermal Conductivity of Semiconductor (Bismuth-Telluride) Semimetal (Antimony) Super-Lattice Nanostructures. D. Pinisetty and R.V. Devireddy. *Acta Materialia*, 58:570-576 (2010).
51. Fabrication and Characterization of Electrodeposited Antimony Telluride Nanowires and Nanotubes. D. Pinisetty, M. Gupta, A.B. Karki, D.P. Young and R.V. Devireddy. *Journal of Materials Chemistry*, 21:4098-4107 (2011). **Back Cover Artwork.**
52. Characterization of Electrodeposited Bismuth-Tellurium Nanowires and Nanotubes. D. Pinisetty, D. Davis, E.J. Podlaha-Murphy, M.C. Murphy, A.B. Karki, D.P. Young and R.V. Devireddy. *Acta Materialia*, 59:2455-2461 (2011).
53. A Novel Experimental Device for Seebeck Coefficient Measurements of Bulk Materials, Thin Films and Nanowire Composites. D. Pinisetty, N. Haldolaarachchige, D.P. Young and R.V. Devireddy, *ASME Journal of Nanotechnology in Engineering and Medicine*, 2: 011006 (2011).
54. MEs in Nanomedicine: In the Mechanics of Medical Treatment, Nanotechnology has Lived up to Much of its Early Promise. G.M. Genin and R.V. Devireddy. Article in: "*Mechanical Engineering: The Magazine of ASME*", Vol. 134/No. 6, pp. 36-41 (2012).
55. Microscale Thermoelectric Devices for Use with Biosystems. D. Pinisetty and R.V. Devireddy. In: "*Multiscale Technologies for Cryomedicine: Implementation from Nano to Macroscale*", edited by X. He, and J.C. Bischof. *Frontiers in Nanobiomedical Research Series*, World Scientific Publishing Corporation, USA. Vol. 5, pp. 173-220 (2016).

In collaboration with my colleague, Dr. Gimble in the Pennington Biomedical Research Center at LSU (and now at Tulane University in New Orleans), we developed various **cryopreservation protocols for adult stem cells (ASCs)**. An important (and unique) feature of our ASC freezing-storage protocols is the development of a cryopreservation media without serum (and without traditional cryoprotective agents) that simplifies their use and application in *in vivo* tissue engineering applications. We have also recently developed a simple non-invasive method of cell retrieval using Methylcellulose coated Tissue Culture Poly-Styrene dishes to allow the creation of **single and multilayered adult stem cell sheet constructs** while preserving the cell-cell and the cell-extracellular matrices. Most recently, we have applied NGS methods (in collaboration with Dr. Hayes at Penn State and Dr. Martin at LSU) to determine **transcriptomic profiles of ASCs undergoing osteogenesis and endotheliogenesis**.

56. Transport Phenomena During Freezing of Adipose Tissue Derived Adult Stem Cells. S. Thirumala, J.M. Gimble and R.V. Devireddy. *Biotechnology & Bioengineering*, 92: 372-383 (2005).
57. The Effect of Various Freezing Parameters on the Immediate Post-Thaw Membrane Integrity of Adipose Tissue Derived Adult Stem Cells. S. Thirumala, S. Zvonic, E. Floyd, J.M. Gimble and R.V. Devireddy. *Biotechnology Progress*, 21: 1511-1524 (2005).
58. A Simplified Procedure to Determine the Optimal Rate of Freezing Biological Systems. S. Thirumala and R.V. Devireddy. *ASME Journal of Biomechanical Engineering*, 127: 295-300 (2005).
59. Cryopreservation Characteristics of Adipose-Derived Stem Cells: Maintenance of Differentiation Potential and Viability. B.C. Goh, S. Thirumala, G Kilroy R.V. Devireddy and J.M. Gimble. *Journal of Tissue Engineering and Regenerative Medicine*, 1: 322-324 (2007).
60. The Effect of Two Different Freezing Methods on the Immediate Post-Thaw Membrane Integrity of Adipose Tissue derived Stem Cells. R. Fuller and R.V. Devireddy. *International Journal of Heat and Mass Transfer*, 51: 5650-5654 (2008).
61. Desiccation Tolerance of Adult Stem Cells in the Presence of Trehalose and Glycerol. S. Mittal and R.V. Devireddy. *Open Biotechnology Journal*, 2:211-218 (2008).
62. Freezing and Post-Thaw Apoptotic Behavior of Cells in the Presence of Palmitoyl Nanogold Particles. S. Thirumala, J.M Forman, W.T. Monroe and R.V. Devireddy. *Nanotechnology*, 18: 195104 (2007).

63. Effect of Palmitoyl Nanogold Particles on the Subzero Thermal Properties of Phosphate Buffered Saline Solutions. A. Guha and R.V. Devireddy. *ASME Journal of Nanotechnology in Engineering and Medicine*, 1: 021004 (2010).
64. Evaluation of Polyvinylpyrrolidone (PVP) as a Cryoprotectant for Adipose Derived Adult Stem Cells. S. Thirumala, X. Wu, J.M. Gimble and R.V. Devireddy. *Tissue Engineering Part C: Methods*, 16: 783-792 (2010). **Cover Article.**
65. Polyvinylpyrrolidone (PVP) Mitigates the Damaging Effects of Intracellular Ice Formation in Adult Stem Cells. A. Guha and R.V. Devireddy. *Annals of Biomedical Engineering*, 38: 1826-1835 (2010).
66. Cryopreservation of Stromal Vascular Fraction of Adipose Tissue in a Serum Free Freezing Media. S. Thirumala, J.M. Gimble and R.V. Devireddy. *Journal of Tissue Engineering and Regenerative Medicine*, 4: 224-232 (2010).
67. Evaluation of Methylcellulose and Dimethylsulfoxide as the Cryoprotectants in a Serum Free Freezing Media for Cryopreservation of Adipose Derived Adult Stem Cells. S. Thirumala, J.M. Gimble and R.V. Devireddy. *Stem Cells and Development*, 19: 513-522 (2010).
68. Cryomicroscopic Investigations of Freezing Processes in Cell Suspensions. T. Acharya and R.V. Devireddy. *Open Biotechnology Journal*, 4:26-35 (2010).
69. Preservation Protocols for Human Adipose Tissue Derived Adult Stem Cells. R.V. Devireddy and S. Thirumala. In: “*Adipose-Derived Stem Cells: Methods and Protocols*”, edited by J.M. Gimble and B.A. Bunnell, Humana Press, Springer Science, New York, NY. *Methods Molecular Biology*, Vol. 702, pp. 369-394 (2011).
70. Methylcellulose Based Thermally Reversible Hydrogel System for Tissue Engineering Applications. S. Thirumala, J. Gimble and R.V. Devireddy. *Cells*, 3: 460-475 (2013).
71. Design of a New Portable Cryostorage Device. F. Breeden, J. LaFountain, M. Laurent, J. Robert and R.V. Devireddy. *ASME Journal of Medical Devices*, 7: 014501 (2013).
72. Cryopreserved Adipose Tissue-Derived Stromal/Stem Cells: Potential for Applications in Clinic and Therapy. F. Zanata, S. Shaik, L. M. Ferreira, R.V. Devireddy and J.M. Gimble. *Advances in Experimental Medicine and Biology*, 951: 137-146 (2016).
73. The Relative Functionality of Freshly Isolated and Cryopreserved Human Adipose Derived Stromal/Stem Cells. F.S. Shah, J. Li, F. Zanata, J.L. Curley, E.C. Martin, X. Wu, M. Dietrich, R.V. Devireddy, J.W. Wade and J.M. Gimble. *Cells Tissues Organs*. 201: 436-444 (2016).
74. Inducing Heat Shock Proteins Enhances the Stemness of Frozen-Thawed Adipose Tissue Derived Stem Cells. S. Shaik, D. Hayes, J. Gimble and R.V. Devireddy. *Stem Cells and Development*, 26: 608-616 (2017).
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In collaboration with my colleague, Dr. Gartia in the department of Mechanical Engineering we are developing new **surface modification techniques** as well as **non-invasive imaging methods** for assessing **stem cell differentiation**. Further, in collaboration with Dr. Arges in the Chemical Engineering Department at LSU we are exploring **novel materials for low temperature energy storage**.

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20. Serum Free Cryopreservation of Adult Stem Cells. J. Medhi, J. Gimble, and R.V. Devireddy. *ASME IMECE*, San Diego, *Technical Presentation* (2013).
21. Relating the Porosity of Poly (L-lactic Acid) Scaffolds to Unidirectional Freezing (Thermal Profiles). H. Chinnasami, F. Breeden, D. Hayes and R.V. Devireddy. *Tissue Engineering International and Regenerative Medicine Society – North America*, Houston, CD-ROM Publication (2011).
22. Molecular Dynamics Simulation Study of Structural Changes and Pore Formation in Phospholipid Bilayers in the Presence of Dimethylsulfoxide. D. Moldovan. R. Alapati, J. Lin, B. Novak and R.V. Devireddy. *March Meeting of the American Physical Society*, Portland (2010).
23. Cellular Biophysics During Freezing of Rat and Mouse Sperm. R.V. Devireddy, J. H. Choi, M. Hagiwara, W. Wolkers, K.P. Roberts and J.C. Bischof. *Cryobiology*, 57: 322 (2008).
24. The Protective Effects of Polyvinylpyrrolidone (PVP) in the Cryopreservation of Human Adipose Derived Adult Stem Cells (huASCs). S. Thirumala, J.M. Gimble and R.V. Devireddy. *Tissue Engineering International and Regenerative Medicine Society – North America*, Toronto, CD-ROM Publication (2007).
25. Atomistic Investigations of Spontaneous Unstable Pore Formation in DMPC Lipid Bilayers due to the Presence of DMSO. D. Pinisetty, D. Moldovan and R.V. Devireddy. *Cryobiology*, 55: 375-376 (2007).
26. Chilling Injury of Mammalian Gametes and Embryos. S.P. Leibo and R.V. Devireddy. *Cryobiology*, 55: 325 (2007).
27. Freezing Characteristics of Macaque and Equine Ovarian Tissue Sections in Mixtures of Dimethylsulfoxide and Ethylene Glycol. A. Kardak, S.P. Leibo and R.V. Devireddy. *Cryobiology*, 53: 415-416 (2006).
28. Calculated Permeability Coefficients For Water and Cryoprotective Additives for Ovine Primordial Follicles at Suprazero Temperatures. R.V. Devireddy and S.P. Leibo. *Cryobiology*, 53: 416-417 (2006).
29. Osteogenic Potential of Frozen-Thawed Adipose Derived Adult Stem Cells. S. Thirumala, B. Goh, J.M. Gimble and R.V. Devireddy. *International Fat Applied Technology Society*, Baton Rouge, CD-ROM Publication (2006).
30. Molecular Dynamic Simulations of Water Permeation Through Biological Membranes in the Presence and Absence of Cryoprotective Agents and Sugars. R.V. Devireddy and D. Moldovan. *Second USNCB Symposium on Frontiers in Biomechanics*, Vail, CO (2005).
31. Freezing Storage of Adult Stem Cells. S. Thirumala, J.M. Gimble and R.V. Devireddy. *Cryobiology*, 51: 393 (2005).
32. Drying Storage of Adipose Derived Adult Stem Cells. S. Mittal, D. Pinisetty and R.V. Devireddy. *Cryobiology*, 51: 401-402 (2005).
33. Design of an Ultrasound Sensor to Measure Water Loss During Drying of Cells. S. Mittal and R.V. Devireddy. *Cryobiology*, 51: 410-411 (2005).



34. Effect of DMSO on POPC and DMPC Lipid Bilayers: An Atomistic Investigation. D. Pinisetty, D. Moldovan and R.V. Devireddy. *Cryobiology*, 51: 413-414 (2005).
35. Improvement of Sperm Recovery Rates After Centrifugation of Stallion Semen. M.S. Ferrer, D.L. Paccamonti, B.E. Eilts, S.K. Lyle and R.V. Devireddy. *Proc Society for Theriogenology Annual Conference and SFT/ACT Symposium*, Lexington, KY, p. 7 (2004).
36. The Effect of Collection and Cooling Conditions on Water Transport Characteristics of Equine Spermatozoa. R.V. Devireddy, D.J. Swanlund, A.S. Alghamdi, M.H.T. Troedsson, J.C. Bischof and K.P. Roberts. 8th International Symposium on Equine Reproduction, *Theriogenology*, 58:233-236 (2002).
37. Effect of Freezing on Mechanical Strength and Cell Viability in Engineered Tissue Equivalents. R.V. Devireddy, M.R. Neidert, J.C. Bischof and R.T. Tranquillo. Industrial Partnership in Interfacial and Material Engineering (IPRIME), University of Minnesota, Minneapolis, MN (2001).
38. Cryopreservation of Stallion Sperm: Optimal Cooling Rates In The Presence Of Extracellular Ice and Cryoprotective Agents. R.V. Devireddy, D.J. Swanlund, A.S. Alghamdi, M.H.T. Troedsson, J.C. Bischof and K.P. Roberts. *Cryobiology*, 43:367-368 (2001).
39. Numerical Modeling of Freezing in Tissues: The Effect of Cell Level Processes on the Macroscale Freezing Problem. R.V. Devireddy, D.J. Smith and J.C. Bischof. *Cryobiology*, 43:344 (2001).
40. Cryopreservation of Bioartificial Tissues: Optimization of Post-Thaw Cell Viability and Mechanical Properties. R.V. Devireddy, M.R. Neidert, R.T. Tranquillo and J.C. Bischof. *Cryobiology*, 43:351 (2001).
41. Cryopreservation of Human Sperm: The Effect of Extracellular Ice and Cryoprotective Agents on the Membrane Permeability Parameters. R.V. Devireddy, D.J. Swanlund, K.P. Roberts, J.L. Pryor and J.C. Bischof. {Abstract # 4392} *Annual American Urologic Conference* (2000).
42. Cryopreservation of Stallion Sperm: Determination of Membrane Permeability Parameters In The Presence Of Extracellular Ice. R.V. Devireddy, D.J. Swanlund, T. Olin, W. Vincente, M. Troedsson, K.P. Roberts and J.C. Bischof. *Cryobiology*, 41:345-346 (2000).
43. Effect Of Microscale Mass and Heat Transport On Phase Change in Tissues and Tissue Engineered Equivalents. D.J. Smith, R.V. Devireddy and J.C. Bischof. {Abstract # T12.44} *Annals of Biomedical Engineering*, 28 (Supp. 1), S-124 (2000).
44. Determination of Loading and Unloading of Cryoprotective Agents in Tissues and Tissue-Equivalents. R.V. Devireddy, S. Bhowmick, M.R. Neidert, R.T. Tranquillo and J.C. Bischof. {Abstract #T12.43} *Annals of Biomedical Engineering*, 28 (Supp. 1), S-124 (2000).
45. Web/Internet based Cryobiology Modeling Tutorial. D.J. Smith, R.V. Devireddy, W. Messner and J.C. Bischof. *Cryobiology*, 37:406 (1998).
46. Prediction of Thermal Profiles and Interface Propagation during Freezing of Biological Systems - Latent Heat Effects. D.J. Smith, R.V. Devireddy and J.C. Bischof. *Cryobiology*, 37:380 (1998).
47. Water Permeability Parameters of Mouse Sperm during Freezing in the Presence of Extracellular Ice and Glycerol. R.V. Devireddy, D.J. Swanlund and J.C. Bischof. *Cryobiology*, 37:416-417 (1998).
48. Freezing Characteristics in Liver of the Freeze-Tolerant Wood Frog. P.R. Barratt, R.V. Devireddy, K.B. Storey and J.C. Bischof. *Cryobiology*, 37:432-433 (1998).
49. Measured Dehydration in AT-1 Rat Tumor Tissue During Freezing. R.V. Devireddy and J.C. Bischof. *Cryobiology*, 35:323-324 (1997).
50. Differential Scanning Calorimetry: Thermal Analysis of Cells and Tissues at Subzero Temperatures to Measure the Biophysical Parameters of Water Transport. R.V. Devireddy, D. Raha and J.C. Bischof. *Cryobiology*, 33:638-639 (1996).

GRADUATE STUDENT & POST-DOCTORAL SUPERVISION:

1. **Mohana Dey, Ph.D.** 3-D Bioprinting, 2022 – present.

2. **Manisha Gupta Ph.D.** miRNA Directed Differentiation of Adipose Derived Stromal/Stem Cells, 2022 – present.
3. **Subhrajyoti Kundu, Ph.D.** 3-D Hyper-Spectral Imaging Modalities, 2022 – present.
4. **Kaushik Sunder M.S.** 3-D Bioprinting of a Model Myocardial Infarct, 2018 – 2021
5. **Shahensha Shaik Ph.D.** Effect of Cryopreservation and Next Generation Sequencing of Adipose Derived Stem Cells, 2013 – 2019, *Current Position:* Post-Doctoral Scholar, Medical School, Vanderbilt University, Nashville, TN.
6. **Dr. Sushant P. Sahu**, 2018 – 2020, *Current Position:* Instructor, Department of Chemistry, University of Louisiana, Lafayette, LA. {Co-advised with Dr. Manas Gartia}
7. **Dr. Jagannath Upadhyay**, 2018 – 2019, *Current Position:* Assistant Professor, Engineering, State University of New York, Utica, NY.
8. **Dr. Cong Chen**, 2015 – 2016, *Current Position:* Regional Manager, Sino Biological, Inc. San Francisco, CA. {Co-advised with Dr. Dan Hayes}
9. **Dr. Jean-Baptiste Decombe**, 2015 – 2016, *Current Position:* Optical Engineer, Valeo, Angers, France. {Co-advised with Dr. Randy Duran}
10. **Harish Chinnasami Ph.D.** Osteogenic Potential Of Poly (L-Lactic Acid) Scaffolds Prepared By Thermally Controlled Methods On Human Adipose Derived Stem Cells, 2010 – 2017, *Current Position:* Regulatory Affairs Lead, HCL Technologies, India.
11. **Jishnu Medhi M.S. (non-thesis project)** Modeling of Thermal Stresses during Freezing, 2013 –2016, *Current Position:* Project Engineer, RAND Engineering and Architecture, Baton Rouge, LA.
12. **Anoosha Forghani M.S.** Thiol-Acrylate *in situ* Polymerization for Bone Defects, 2013 –2016, *Current Position:* Senior Scientist, Eurofin Lancaster Laboratories, PA.
13. **Colton McElheny M.S.** Development of a Three-Dimensional Bio-Printer with Inline Light Activation for Bone Tissue Engineering, 2013 – 2015, *Current Position:* Industry, Houston, TX
14. **George Idicula M.S.** Synthesis of Poly (L-Lactic Acid) Scaffolds From Dioxane/Ethanol Using Control Rate Freezing and Study of it's Microstructural Properties, 2011 – 2013. *Current Position:* CB&I, Houston, TX
15. **Dipon Chanda M.S.** Liposomal Uptake of Gold and Silver Nanoparticles, 2010 – 2013. *Current Position:* Embedded Software Engineer at FCA Fiat Chrysler Automobiles, Kokomo, IN.
16. **Dr. Andy Zanetti**, 2011 – 2012, *Current Position:* Resident Veterinarian, Department of Animal Resources, University of Southern California, Los Angeles, CA.
17. **Dinesh Pinisetty Ph.D.** Fabrication, Characterization, Modeling and Testing of a Nanostructured Bulk Thermoelectric Cooler, 2005 – 2011, *Current Position:* Associate Professor and Department Chair, Engineering Technology, California Maritime Academy, Vallejo, CA
18. **Raghava Alapati M.S.** Atomistic Simulations of Dimethylsulfoxide Interactions with Lipid Bilayers, 2007 – 2009. *Current Position:* Engineer, Ternium, LA
19. **Sreedhar Thirumala Ph.D.** Cryopreservation of Adult Stem Cells in Suspension and in Multi Dimensional Sheets, 2004 – 2009. *Current Position:* Director, Process Development and Manufacturing (Cell and Gene Therapy Clinical Programs) - Indiana University School of Medicine.
20. **Avishek Guha M.S.** Mitigation of the Damaging Effects of Intracellular Ice Formation in Adult Stem Cells by Polyvinylpyrrolidone, 2007 – 2009. *Current Position:* Senior Engineer, Air Products, PA
21. **Tat Acharya M.S.** Freezing Processes in Cell Suspensions Evaluated Using Cryomicroscopy, 2006 – 2008. *Current Position:* Assistant Professor, Department of Physics and Engineering, California State University, Bakersfield, CA.
22. **Ajay Kardak M.S.** Fabrication of Micro Bumps for Micro Scale Thermal Management, 2005 – 2008. *Current Position:* Principal Mechanical Engineer, Optimum Engineering Solutions, Inc., Edwardsville, IL.
23. **Phani Mylavarapu Ph.D.** Ultrasonic Characterization of Composite Structures, 2001 – 2006 (minor advisor). *Current Position:* Senior Scientist, DRDO, India.
24. **Aparna Prabhakar M.S.** Modeling, Fabrication and Characterization of a Bio-Micro-Thermoelectric Device for Highly Localized Temperature Control, 2003 – 2006 *Current Position:* Technology Innovation Program Manager, IBM, NY



25. **Adam Cygan M.S.** Modeling and Fabrication of a Microthermocouple Array, 2003 – 2006, *Current Position:* Industry, Houston, TX {Co-advised with Dr. Michael Murphy}
26. **Guanglei Li M.S.** Cryopreservation of Reproductive Cells and Tissues, 2004 – 2005, *Current Position:* Senior Project Manager, China
27. **Surbhi Mittal M.S.** Modeling and Experimentation of Drying of Adipose Derived Adult Stem Cells, 2003 – 2005, *Current Position:* Failure Analysis Engineer, IBM, NY
28. **Dinesh Pinisetty M.S.** Molecular Dynamic Simulations of Biological Membranes in the Presence of Cryoprotectants, 2003 – 2005, *Current Position:* Associate Professor and Department Chair, Engineering Technology, California Maritime Academy, Vallejo, CA
29. **Deepak Kandra M.S.** Tissue Interactions with Lasers and Liquid Nitrogen – A Novel Cryopreservation Method? 2002 – 2004, *Current Position:* Senior Engineer, Arup, NY
30. **Yimeng He M.S.** Numerical and Experimental Investigation of Transport Processes in Biological Systems, 2001 – 2004, *Current Position:* ATS, China
31. **Sreedhar Thirumala M.S.** Optimal Rate of Freezing Biological Systems, 2001 – 2004, *Current Position:* Director, Process Development and Manufacturing (Cell and Gene Therapy Clinical Programs) - Indiana University School of Medicine.

SELECTED STUDENT AWARDS:

Y. He: Finalist Student Paper Competition ASME Summer Bioengineering Conference (2003)

S. Mittal: Materials Research Society Ribbon Best Poster Award (2003)

A. Cygan: NSF Graduate Fellow (2003 – 2006)

G. Li: Top 10 most downloaded articles in Molecular Reproduction & Development (2007)

S. Thirumala:

LSU Economic Development Assistant Fellowship (2004 – 2007)

Best presentation LSU ME Graduate Student Conference (2004 & 2007)

Best presentation IFATS (2006)

LSU Dissertation Fellowship (2007 – 2008)

LSU Office of Research & Development Student Travel award (2009)

College of Engineering Best PhD Dissertation Award (2009)

Tissue Engineering Cover Article (2010)

Cells Best Paper Award (2013)

Organizing Committee, Society for Cryobiology Annual Meeting (2015)

T. Acharya:

Best presentation LSU ME Graduate Student Conference (2009)

LSU Office of Research & Development Student Travel award (2008)

D. Kandra:

Design Engineer: Crenshaw/LAX Transit Corridor in Los Angeles; The Second Avenue Subway and the World Trade Center Transit Hub; I-90 Two Way Transit project in Seattle

Arup Associate (2015)

A. Guha: ISHMT-ASME Conference best poster Award (2010)

A. Prabhakar:

IBM China Engineering Solutions Team Lead (>\$400 M/year)

Technology Innovation Program Manager at IBM Corporate Strategy (2006 – present)

Women of Color STEM Technology Rising Star Award (2015)

A. Kardak: Best Teaching Assistant LSU Mechanical Engineering (2008)



H. Chinnasami:

Finalist best poster ASME 3rd Global Congress on Nanoengineering for Medicine and Biology meeting (2013)

Finalist best paper Tissue Engineering International and Regenerative Medicine Society meeting (2011)

A. Forghani:

LSU LA-SiGMA Travel Award, ASME SB3C conference (2015)

LSU Office of Research & Development Student Travel award (2014)

D. Pinisetty:

LSU Economic Development Assistant Fellowship (2005 – 2009)

Best presentation LSU ME Graduate Student Conference (2008)

LSU Office of Research & Development Student Travel award (2010)

LSU Dissertation Fellowship (2009 – 2010)

MRS Spring Meeting Finalist best presentation (2010)

College of Engineering Finalist PhD Dissertation Award (2011)

Journal of Materials Chemistry Back Cover Art Work (2011)

S. Shaik:

Finalist best poster ASME 4th Global Congress on Nanoengineering for Medicine and Biology meeting (2015)

College of Engineering Best PhD Dissertation Award (2019)

Honorable mention LSU Distinguished Dissertation Award (2020)



TEACHING EVALUATIONS - Results of Student Evaluation on a 0 to 4.0 Scale

Semester {Course #} Course Title	Responses (Class Size)	Instructional Technique	Instructional Support/Effort	Overall Effectiveness
Fall 2001 {ME 7863} Fluid Dynamics	6 (13)	3.000	3.292	2.833
Spring 2002 {ME 7853} Advanced Boundary Layer Theory	10 (11)	3.617	3.425	3.400
Fall 2002 {ME 4383} Thermal System Design	16 (19)	3.646	3.734	3.750
Fall 2002 {ME 4933} Biological Fluid Flow and Heat Transfer	12 (12)	3.764	3.702	3.833
Spring 2003 {ME 3333} Thermodynamics for Non-MEs	42 (69)	3.588	3.617	3.690
Fall 2003 {ME 2334} Thermodynamics for ME Majors	46 (87)	3.536	3.500	3.739
Spring 2004 {ME 2334} Thermodynamics for ME Majors	58 (97)	3.830	3.819	3.897
Fall 2004 {ME 7433} Advanced Heat Transfer I: Conduction & Radiation	23 (33)	3.833	3.852	4.000
Spring 2005 {ME 4353} Advanced Engineering Thermodynamics	11 (15)	3.879	3.886	3.909
Spring 2005 {ME 4933} Principles of Tissue Engineering	11 (16)	3.844	3.773	3.818
Fall 2005 {ME 7433} Advanced Heat Transfer I: Conduction & Radiation	9 (12)	3.944	3.972	4.000
Spring 2006 {ME 4433} Heat Transfer	43 (63)	3.365	3.322	3.651
Spring 2006 {ME 4611} Thermal Systems Lab	Supervision Only (9 sections with 117 students)			
Fall 2006 {ME 4621} Thermal Science Lab	Supervision Only (9 sections with 116 students)			
Spring 2007 {ME 2334} Thermodynamics for MEs	45 (65)	3.730	3.839	3.911
Spring 2007 {ME 4621} Thermal Science Lab	9 (9)	3.796	3.833	3.889



Semester {Course #} Course Title	Responses (Class Size)	Instructional Technique	Instructional Support/Effort	Overall Effectiveness
Fall 2007 {ME 2334} Thermodynamics for ME Majors	28 (65)	3.899	3.884	4.000
Spring 2008 {ME 4933} Biological Thermodynamics	5 (6)	3.600	3.550	3.800
Fall 2008	Sabbatical Leave: Lifeline Hospitals, India (and IIT, Madras)			
Spring 2009 {ME 2334} Thermodynamics for ME Majors	61 (110)	3.516	3.440	3.797
Fall 2009 {ME 2334} Thermodynamics for ME Majors	32 (80)	3.609	3.680	3.844
Spring 2010 {ME 7443} Advanced Heat Transfer II: Convection	8 (8)	3.766	3.774	4.000
Fall 2010 {ME 3834} Fluid Mechanics	126 (177)	3.366	3.352	3.600
Spring 2011 {ME 3333} Thermodynamics for Non-MEs	16 (29)	3.896	3.938	4.000
Fall 2011 {ME 3834} Fluid Mechanics	135 (160)	3.481	3.411	3.652
Spring 2012 {ME 7443} Advanced Heat Transfer II: Convection	12 (13)	4.000	4.000	4.000
Fall 2012 {ME 2334} Thermodynamics for MEs	51 (116)	3.711	3.749	3.749
Fall 2012 {ME 4621} Thermal Science Lab	Supervision Only (9 sections with 121 students)			
Spring 2013	No Teaching Duties (Technical Program Chair for the <i>ASME Summer Bioengineering Conference</i>)			
Fall 2013 {ME 4433} Heat Transfer	12 (16)	3.875	4.000	4.000
Spring 2014 {ME 7443} Advanced Heat Transfer II: Convection	7 (8)	3.833	3.857	3.833
Spring 2014 {ME 4611} Thermal System Lab	Supervision Only (9 sections with 120 students)			
Fall 2014 {ME 3834} Fluid Mechanics	95 (168)	3.760	3.671	3.766



Semester {Course #} Course Title	Responses (Class Size)	Instructional Technique	Instructional Support/Effort	Overall Effectiveness
Fall 2014 {ME 4621} Thermal Science Lab	Supervision Only (9 sections with 120 students)			
Spring 2015 {ME 7443} Advanced Heat Transfer II: Convection	8 (8)	3.905	3.964	4.000
Spring 2015 {ME 4611} Thermal System Lab	Supervision Only (9 sections with 117 students) <i>(Developed protocols and manuals for 3 new experiments)</i>			
Fall 2015 {ME 2334} Thermodynamics for ME Majors	55 (151)	3.694	3.627	3.836
Spring 2016	Sabbatical Leave: Yokohoma National University, Japan (Japan Society for Promotion of Science Fellowship)			
Fall 2016 {ME 3834} Fluid Mechanics	76 (177)	3.676	3.700	3.737
Spring 2017 (ME 2334) Thermodynamics	36 (144)	3.167	3.286	3.457
Fall 2017 (ME3333) Thermodynamics for Non-ME Majors	21(66)	3.119	3.188	3.550
Fall 2017 {ME 7433} Advanced Heat Transfer I: Conduction & Radiation	0(3)	N/A	N/A	N/A
Spring 2018 (ME 2334) Thermodynamics	34 (137)	3.555	3.597	3.767
Spring 2018 {ME 7443} Advanced Heat Transfer II: Convection	0(3)	N/A	N/A	N/A

NEW ONLINE EVALUATION with SCALE RANGING FROM 0 to 5

Course	Responses (Class Size)	Effective Teacher (Dept. Avg.)	Overall Effectiveness (Dept. Avg.)
Fall 2018 {ME 4433} Heat Transfer	20 (73)	4.5 (3.9)	4.4 (3.8)
Fall 2018 {ME 4621} Thermal Science Lab	Supervision Only (7 sections with 80 students)		
Fall 2018 {ME 4611} Thermal Systems Lab	9 (12)	4.4 (3.8)	4.6 (3.9)



Course	Responses (Class Size)	Effective Teacher (Dept. Avg.)	Overall Effectiveness (Dept. Avg.)
Fall 2018 {ME 7433} Advanced Heat Transfer I: Conduction & Radiation	4 (7)	4.3 (3.8)	4.4 (3.9)
Fall 2018 {ME 4611} Thermal Systems Lab	Supervision Only (5 sections with 60 students)		
Spring 2019 {ME 4611} Thermal Science Lab *Taught 2 sections with 12 students each	9 (12)	4.7 (3.8)	4.5 (3.9)
Spring 2019 {ME 4621} Thermal Science Lab	Supervision Only (8 sections with 95 students)		
Spring 2019 {ME 7443} Advanced Heat Transfer II: Convection *Taught as ME 7903	2 (2)	5.0 (3.8)	5.0 (3.9)
Fall 2019 {ME 4621} Thermal Science Lab	Supervision Only (8 sections with 84 students)		
Fall 2019 {ME 4611} Thermal Systems Lab	Supervision Only (6 sections with 63 students)		
Fall 2019 (ME 2334) Thermodynamics for ME Majors	54 (134)	4.4 (3.8)	4.2 (3.9)
Fall 2019 {ME 4611} Thermal Systems Lab Section #05	1 (5)	5.0 (3.8)	4.7 (3.9)
Spring 2020 {ME 7443} Advanced Heat Transfer II: Convection	1 (2)	5.0 (3.9)	5.0 (4.0)
Spring 2020 {ME 4621} Thermal Science Lab	Supervision Only (6 sections with 73 students)		
Spring 2020 {ME 4611} Thermal Systems Lab	Supervision Only (8 sections with 102 students)		
Spring 2020 {ME 4611} Thermal Systems Lab Section #03	3 (13)	4.0 (3.9)	4.3 (4.0)
Fall 2020 {ME 4243} ME Capstone Design I Section #03	7 (23)	4.1 (3.8)	4.2 (3.9)
Fall 2020 {ME 4611} Thermal Systems Lab	Supervision Only (2 sections with 17 students)		
Fall 2020 {ME 4621} Thermal Science Lab	Supervision Only (5 sections with 60 students)		



Course	Responses (Class Size)	Effective Teacher (Dept. Avg.)	Overall Effectiveness (Dept. Avg.)
Spring 2021 (ME 2334) Thermodynamics for ME Majors	42 (124)	4.6 (4.0)	4.4 (4.0)
Spring 2021 {ME 4611} Thermal Systems Lab	Supervision Only (7 sections with 68 students)		
Spring 2021 {ME 4202} ME Capstone Design II Section #03	** (23)	Data Unavailable	
Fall 2021 {ME 7433} Advanced Heat Transfer I: Conduction & Radiation	1 (3)	5.0 (3.8)	5.0 (3.9)
Fall 2021 {ME 4611} Thermal Systems Lab Section #01	10 (12)	4.3 (3.8)	4.2 (3.9)
Fall 2021 {ME 4621} Thermal Science Lab	Supervision Only (4 sections with 45 students)		
Spring 2022 {ME 4611} Thermal Systems Lab	Supervision Only (7 sections with 77 students)		
Spring 2022 {ME 4621} Thermal Science Lab	Supervision Only (5 sections with 57 students)		
Spring 2022 (ME 2334) Thermodynamics for ME Majors	20 (78)	4.3 (3.9)	4.2 (3.7)
Fall 2022 {ME 4243} ME Capstone Design I Section #03	* (34)	**. (**)	**. (**)
Fall 2022 {ME 4611} Thermal Systems Lab Section #01	* (14)	**. (**)	**. (**)
Fall 2022 {ME 4611} Thermal Systems Lab	Supervision of 2 other sections with 27 students		
Fall 2022 {ME 4621} Thermal Science Lab	Supervision Only (4 sections with 36 students)		
Spring 2023 {ME 4202} ME Capstone Design II Section #03	* (**)	**. (**)	**. (**)
Spring 2023 {ME 4611} Thermal Systems Lab	Supervision Only (* sections with ** students)		
Spring 2023 {ME 4621} Thermal Science Lab	Supervision Only (* sections with ** students)		



Course	Responses (Class Size)	Effective Teacher (Dept. Avg.)	Overall Effectiveness (Dept. Avg.)
Spring 2023 {ME 4433} Heat Transfer	* (**)	*.* (*.*)	*.* (*.*)

NEW COURSES DEVELOPED

Biological Fluid Flow and Heat Transfer: Senior/First year graduate student level course on fluid mechanics of time dependent flows in the human circulatory system; momentum, heat and mass transfer principles at the cellular, organism, and system level; heat exchange between the biological system and its environment; and mass transfer in biological organelles and membranes.

Principles of Tissue Engineering: Senior/First year graduate student level course introduces the field of tissue engineering, including cell biology, molecular biology, material science and their relationship towards developing novel materials.

Biological Thermodynamics: Senior/First year graduate student level course on the basic laws of classical thermodynamics with illustrations of their biological application; the Gibbs Free Energy, chemical potential and interfacial thermodynamics; the electrochemical potential and its application to membrane transport; statistical and non-equilibrium thermodynamics applied to membranes, polymers, liquid crystals, nanoscale devices, DNA and evolution.

Thermal Systems Laboratory: Developed laboratory manuals for three new experiments (2015): “Internal Combustion Engine”, “Heating, Ventilation and Air Conditioning Experiment” and “Rankine Power Cycle”.

BIOGRAPHICAL SKETCH

Dr. Ram Devireddy is the DeSoto Parish Chapter University Alumni Professor and the Louisiana Land & Exploration Company Endowed Chair Professor of Mechanical Engineering at Louisiana State University, Baton Rouge. Dr. Devireddy received his Ph.D. from the University of Minnesota, Minneapolis (1999), M.S. from the University of Colorado, Boulder (1995) and his bachelor's degree from the University of Madras, India (1993) in Mechanical Engineering. Dr. Devireddy's primary research contributions include *developing new methods to assess the state of water during freezing in biological systems, to fabricating novel microscale bio-thermal devices and more recently, to directing osteogenic differentiation of adult stem cells using miRNAs*. The multidisciplinary breadth of his research spans areas such as: stem cell preservation, miRNA directed differentiation, 3d bioprinting, tissue freezing (experimental and numerical), mammalian and aquatic sperm cell cryopreservation, modeling of chemical diffusion at macro- and micro-scales, nano- and micro-scale heat transfer phenomena, transcriptome profiling and next generation sequencing methods. The quality of his publications has been recognized by: best paper awards from the ASME Journal of Heat Transfer (2002), Mid-West Thermal Analysis Forum (1999), the Society of Cryobiology (1998), Cells (2013) and the Material Research Society (2003); cover articles for *Tissue Engineering* (2010), *Journal of Materials Chemistry* (2012); top 10 most cited articles in *Molecular Reproduction and Development* (2007). Since, joining LSU Dr. Devireddy has been funded continuously from a variety of sources including the Louisiana Board of Regents, the Whitaker Foundation, the NIH, the NSF, NASA and the LSU systems office (>\$12M Total, >\$4M PI Share). He has advised or co-advised to graduation 24 students (19 M.S. and 5 Ph.D.), served as a committee member or a Dean's representative for another 53 students. In 2011 he was inducted as a Fellow of the American Society of Mechanical Engineers (ASME). Dr. Devireddy has received numerous honors and awards including a Brains (back) to Brussels Fellowship to visit Université Catholique de Louvain, Brussels (2009), and a Japan Society for Promotion of Science (JSPS) Fellowship to visit the Yokohama National University, Tokyo (2016). Dr. Devireddy is also the recipient of the Louisiana Alumni Association Faculty Excellence Award (2013), the DeSoto Parish Chapter LSU Alumni Professorship (2015), the LSU Distinguished Faculty Award (2021) and the Worley Professor of Excellence (2022).

