CURRICULUM VITAE

VINOD KUMAR, PhD
Chair & Professor, Department of Mechanical & Industrial Engineering
Texas A&M University, Kingsville

Director, Advanced Modeling & Simulation Labs (AMSL)
Co-director, Rio Grade Consortium for Advanced Research on Exascale Simulations (Grande CARES)
Co-founder: DeepVein Inc
Email: vk.rice@gmail.com
https://sites.google.com/view/mu2com

EDUCATION & TRAINING

Princeton University/NOAA/GFDL - Postdoc/Sr. researcher, Geo. Fluid Dyn./Climate modeling/HPC (Mentor: Dr. V. Balaji) (2007-08)
Rice University, Houston, TX
   Postdoc/researcher, Physics & Astronomy MHD/HPC/Space Plasma (Profs R. Wolf & F.Toffoletto) (2005-07)
   PhD, Mechanical Engineering, 2005
      Title: Advanced computational techniques for incompressible/compressible fluid-structure interaction
      problems (Advisor: Prof. Richard Tapia, Computational and Applied Mathematics)
IIT Kanpur, India - B.Tech (B.S.), Aerospace Engineering, 1997

PROFESSIONAL EXPERIENCE

Full-Time Professional Experience

Texas A&M University-Kingsville	Professor and Chair, Mechanical and Industrial Engineering	08/2023-Current
Calysta Inc., Menlo Park	Senior Scientist	01/2019-04/2020
The University of Texas, El Paso (UTEP)	Associate Professor, Mechanical Engineering	09/2014- 08/2023
	Assistant Professor, Mechanical Engineering	2008 - 2014
Fluent (ANSYS) Inc.	CFD Engineer	1997-1999

Part-Time Professional Experience

	Stanford University	Innovative Healthcare Leadership, Stanford Graduate School of Business	June, 2022
	SNL	Visiting Professor, Advanced Computing, HPC	01/2016- 01/2019
		Sabbatical, Extreme scale /Exascale Computing, HPC (Mentor: Dr. Spotz)	08/2015- 12/2015
		Visiting Professor, Solid Particle Receiver, Solar Energy, CSP (Mentor: Dr. Cliff Ho)	09/2012- 08/2015
		Faculty Res/Consultant, CFD/HPC Modeling, High Order Schemes (Mentor: Dr. M. Taylor)	08/2010-08/2013
	NREL	EERE FaST Fellow, Solar Energy - CSP/TES (Mentors: Drs. Ma, Glatzmier, Desikan)	Summer 2011
	NETL	ORISE Fellow, Porous flow, CO2 Sequestration, EOR (Drs. G. Bromhal, D. McIntyre, C. McIntyre)	Summer 2010
	ORNL	Summer Fellow, CFD/Geo Phys. Fluid Modeling/HPC (Drs. T. White, K. Evans, J. Drake)	Summer 2009
	AFRL RDSM /	CFD/LES modeling for Optical Turbulence/Directed Energy (Dr. R. Gudimetla)	Summer 2012

	MHPCC	Phase screen simulations for Optical Turbulence/Directed Energy	2016 2017 2021
		CFD/LES and Phase screen simulation, AI/ML analysis	
		Physics informed machine learning (AI/ML) for remote sensing	
	HAFB	CFD modeling for water braking of HHSST Sled test (Drs. R. Edmonds, M. Zeisset, M. Hooser)	Summer 2018
	IIT K	UG RA, CFD/Flow Past Cylinder, Aerospace Engineering (Dr. S. Mittal)	05/1995-07/1997

DOE: Department of Energy, DOD: Department of Defense, NREL: the National Renewable Energy Lab, NETL: National Energy Technology Lab, ORNL: Oak Ridge National Lab, AFRL: Air Force Research Lab, AFTC: Air Force Test Center, HAFB: Holloman Air Force Base, MHPCC: Maui High Performance Computing Center, UTEP: University of Texas at El Paso, GFDL:Geophysical Fluid Dynamics Lab, MHD: Magneto-hydrodynamics, HPC: High Performance Computing

RESEARCH

Funded Research activities

- *UTEP (PI **Kumar**, Bronson,Sharma, Tandon, Tosh), UNM (Lead, PI Vorobieff), NMSU, NMT, PVTAMUV & Sandia (PI Tezaur)., "The Rio Grande Consortium for Advanced Research on Exascale Simulation (Grande CARES)", DOE NNSA MSIPP, 2022-27, $5M (UTEP $1.25M)*
- V. **Kumar** (PI), "*BOUNDARY-LAYER TRANSITION MEASUREMENTS ON A BLUNT OGIVE AT MACH 6"*, *AFOSR, 2022-24, $650k*
- V. **Kumar** (PI), *BROADENING NATIONAL FOUNDATION ON ADVANCED MODELING & SIMULATIONS,* DOE/ASCR, 2022-23, **$44k**
- A. Bronson (PI), V. **Kumar** (Co-PI), O. Cedillos (Co-PI), "Reactive Wetting of HF Alloy Melts into B4C Packed Bed Forming Ceramic Composites", AFOSR, 2021-2024, **$450k**
- V. **Kumar** (**PI**), R. Edmonds (Collaborator - Holloman AFB), "*CFD Modeling of Water Braking Phenomena of the HHSTT Sleds*", <u>AFOSR</u>, **6/2019 – 12/2022, $360,000** (AFOSR $270k)
- **V. Kumar (PI)**, V. Tandon, B. Calvo, "Explore STEM for students ages 14-21 with disabilities", Texas Workforce Commission (TWC), 2022, **$60k**
- **V. Kumar (PI)**, V. Tandon, B. Calvo, "Explore STEM for students ages 14-21 with disabilities", Texas Workforce Commission (TWC), 2021, **$65k**
- **V. Kumar (PI)**, N. Agarwal(Co-PI), "Explore STEM for students ages 14-21 with disabilities", Texas Workforce Commission (TWC), 2020, **$64k**
- **V. Kumar (PI)**, N. Agarwal(Co-PI), "Explore STEM for students ages 14-21 with disabilities", Texas Workforce Commission (TWC), 2019, **$32k**
- V. Kumar (PI), N. Agarwal(Co-PI), "Explore STEM for students ages 14-21 with disabilities", Texas Workforce Commission (TWC), 2018, **$26k**
- C. Ramana (PI), **V. Kumar** (CO-PI), A. Bronson (CO-PI), D. Hodges (CO-PI), "Acquisition of Atomic Layer Deposition System to Realize Advanced High Electrical Strength Materials for Extreme Environment Applications", AFOSR, 2019-20, **$590K**
- **V. Kumar** (**PI**), R.Gudimetla (Collaborator –AFRL), "Remote Sensing and Imaging Physics: Developing new metrics for deep turbulence effects on laser propagation through long path", <u>**AFOSR**</u>, **5/2017 – 5/2020, $150k**
- A. Bronson (PI), V. **Kumar** (Co-PI), "Computational-Experimental Reactive Wetting of Hf-Ti-Me Alloy Melts with B4C", <u>**AFOSR**</u>, **8/15/2017 – 8/14/2020, $668,710** (AFOSR $450k)
- **V. Kumar** (PI), W. Spotz (Collaborator – Sandia), "High Fidelity Computational Model for Fluidized Bed Experiments", NETL - <u>Dept. of Energy-Fossil Energy</u>, 9/1/2015 – 8/31/2018, $400,000
- V. Tandon (PI), V. **Kumar** (Co-PI), N. Soheil (Co-PI), C. Ferregut (Co-PI), W. Stern - GFDL (Collaborator), "Understanding the Consequences and Costs of Climate Change to the Texas Transportation System", <u>TxDOT</u>, 09/2015-08/2017, $250K
- V. Tandon (PI), V. **Kumar** (Co-PI), "Understanding Impact of Climate Change on Highway Hydraulic Design Procedures", <u>SPTC Research</u>, Education and Outreach Support, 11/1/2015-10/31/2017, $90K
- V. **Kumar** (PI), "Sunshot particle receiver project: near-blackbody, enclosed particle receiver integrated with fluidized-bed heat exchanger", <u>Subcontract (NREL, DOE)</u>, 12/2014-03/2015, $27,808

- V. **Kumar** (PI), "Sunshot particle receiver project: near-blackbody, enclosed particle receiver integrated with fluidized-bed heat exchanger", <u>Subcontract (NREL, DOE)</u>, 10/2013-11/2014, $17,856
- A. Bronson (PI), V. **Kumar** (CO-PI, 45%), Computational -Experimental Processing of Boride/Carbide Composites by Reactive Infusion of Hf Alloy Melts into B4C, **AFOSR**, 5/1/2012-4/30/2015, $396,441.
- A. Bronson (PI, 55%), V. **Kumar** (CO-PI), Computational -Experimental Study of the Plasma Processing of Carbides at High Temperatures, <u>Department of Energy - Fossil Energy</u>, 9/1/2012 – 8/31/2015, $200,000.
- V. **Kumar** (PI), Collaborator: Dr. C. Harris (Shell Oil Company & Imperial College), "High fidelity computational analysis of CO2 trapping at pore scales," <u>Department of Energy - Fossil Energy</u>, 12/01/2009 – 07/30/2013, $288,858
- V. **Kumar** (PI), Collaborator: Banerjee (TAMU) & Glatzmaier/Bharathan/Ma (NREL), "Computational Analysis of NanoParticles-Molten Salt Thermal Energy Storage for Concentrated Solar Power Systems," <u>DOE - Energy Efficiency and Renewable Energy/SunShot</u>, 09/01/2010 – 07/31/2014, $348,875.
- A. Choudhuri (PI), N. Love (CO-PI), C. Ramana(CO-PI), E. Shafirvich(CO-PI), V. **Kumar**(CO-PI), H. Meeuwsen(CO-PI), "Graduate assistance in areas of national need (GAANN) program", <u>US Department of Education</u>, 08/16/2012-08/15/2015, $399,798.
- V. **Kumar** (PI),"Adaptive Renewable Energy Course Modules Using DOE's System Advisor Model in Cloud Computing Framework", <u>IBM</u>, 01/12-12/12, $10,000.
- V. **Kumar** (PI), "Flexible Modeling Services: Climate Modeling", <u>HPTi for the GFDL/NOAA at Princeton University</u>, 1/2010-8/2010, $2,603.
- V. **Kumar** (PI), "Flexible Modeling Services: Climate Modeling", <u>HPTi for the GFDL/NOAA - Princeton University</u>, 4/12008-3/31/2009, 2010, $6,824
- V. **Kumar** (PI, 100%), "High order scheme for climate Modeling", <u>ORISE</u> - Oak Ridge National Laboratory, 06/01/2009 – 08/07/2009, $23,612.
- R. Romero (PI), V. Gonzalez, J. Hurtado, J. Konter, V. **Kumar** (Senior Personnel), B. S-Konter, R. Wicker, "MRI: Acquisition of the Cyber-ShARE Collaborative Visualization System", <u>National Science Foundation</u>, 05/01/2009-04/30/2012, $556,546.
- V. **Kumar**, "Faculty Startup Funds", <u>UTEP</u>, 2009-10, $168,000
- V. **Kumar**, "Faculty Science and Technology Acquisition and Retention (STARS) Program", <u>UT System</u>, 2009-10, $216,000

Scholarly Contributions (Note: Asterisk (*) implies a student from *Dr. Kumar's research group)*
Patents disclosure:
- A. Bronson, **V. Kumar**, S. Shantha-Kumar*, A. Sepulveda*, "Transformative B-Si-Al-Fe/ B2O3-SiO2-Al2O3-Fe3O4 Systems Embedded in SiC for Concentrating Solar Power", U.S. Patent Application No. 14/987,683

Peer reviewed scholarly contributions (*student)*:

2022
- VMK Kotteda, A Kommu, and V **Kumar**, Characterization of Flow Regimes In Gas-Solid Fluidized Beds Via a Data-Driven Framework', pending, Journal of Fluid Engineering, 2022.
- D Villanueva, B Paez, A Rodriguez, A Chattopadhyay, VMK Kotteda, R Baez, J Perez, J Terrazas, V **Kumar**, Field predictions of Hypersonic Cones using Physics-Informed Neural Networks, ASME 2022 Fluids Engineering Division Summer Meeting, August 1 - 3, 2022
- R. Baez, J Perez, J Terrazas, A Rodriguez, D Villanueva, B Paez, A Cruz, O Fuentes, V **Kumar**, Physics-Informed Long-Short Term Memory Neural Network Performance on Holloman High- Speed Test Track Sled Study, ASME 2022 Fluids Engineering Division Summer Meeting, August 1 - 3, 2022,
- A Rodriguez, VSRao Gudimetla, R Adansi, J Terrazas, V Corral, R Baez, B Paez, C Harris, V **Kumar**, Atmospheric Turbulence Intermittency effects on Remote Sensing Laser Propagation, ASME 2022 Fluids Engineering Division Summer Meeting, August 1 - 3, 2022
- A Cruz, A Rodriguez, VMK Kotteda, B Paez, D Villanueva, C Chijioke, J Terrazas, V **Kumar**, XFOIL extend to Low Reynolds Number Airfoils, ASME 2022 Fluids Engineering Division Summer Meeting, August 1 - 3,

2022

- D Rodriguez, L Trevizo, A Rodriguez, J Aguilar, C Chijioke, B Paez, R Baez, VMK Kotteda, V **Kumar**., Fluid Mechanics Advanced Modeling and Simulations Seminar Informal Learning Experience Overview, ASME 2022 Fluids Engineering Division Summer Meeting, August 1 - 3, 2022
- N Dudu, A Rodriguez, VMK Kotteda, R Baez, B Paez, J Terrazas, D Villanueva, A Enriquez, V **Kumar**, Molecular Diffusion in Boundary-Layer Transition, ASME 2022 Fluids Engineering Division Summer Meeting, August 1 - 3, 2022
- N Dudu, A Rodriguez, VMK Kotteda, J Terrazas, D Villanueva, C Chijioke, R Baez, B Paez, V **Kumar**, Is it Turbulent or Laminar? Convolutional Neural Network Predic- tions, ASME 2022 Fluids Engineering Division Summer Meeting, August 1 - 3, 2022
- B Paez, A Rodriguez, VMK Kotteda, A Chattopadhyay, L Rodriguez, R Baez, V **Kumar**, Mesh Adaptability Technique for Canonical Turbulent Jet Flows via Reinforcement Learn- ing, ASME 2022 Fluids Engineering Division Summer Meeting, August 1 - 3, 2022
- C Chijioke, A Rodriguez, D Villanueva, A Enriquez, J Terrazas, VMK Kotteda, V Tandon, V **Kumar**, FSI of a Cantilever Beam: FVM-FEM and Neural Network Analysis, ASME 2022 Fluids Engineering Division Summer Meeting, August 1 - 3, 2022

2021

- S Afrin, N Hossain, Z Ma, VMK Kotteda*, and V **Kumar**, On-Sun Testing of a High Temperature Solar Receiver's Flux Distribution, J. Sol. Energy Eng 1, 1-24 (2021).
- A Badhan*, VMK Kotteda, S Afrin, **V Kumar,** "Quantifying uncertainty in the residence time of the drug and carrier particles in aDry Powder Inhaler", Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering. (2021), https://doi.org/10.1115/1.4050250
- VMK Kotteda, H Janssen, C Harris, **V Kumar**, "A Novel Mathematical Framework for the Venous Valve Leaflet MorphologyExtracted From In-Vitro Images Using Machine Learning Assisted Stereological Analysis", Proceedings of the ASME 2021 Fluids Engineering DivisionSummer Meeting, August 10 - 12, 2021, Online, Virtual Conference. (2021).
- R Adansi*, J Terrazas*, A Rodriguez*,VMK Kotteda, **V Kumar,** "Performing Fourier Transform on a Velocity Profile FromAtmospheric Turbulence Studies", FEDSM2021- 65812, Proceedings of the ASME 2021 Fluids Engineering Division Summer Meeting, August 10 - 12, 2021, Online, VirtualConference (2021).
- A Rodriguez*, J Terrazas*, , R Adansi*, J Munoz,VMK Kotteda, **V Kumar**, "Causal Inference Analysis to Find Relationships Found in Boundary-Layer Transition – PART I: THEORETICAL", FEDSM2021-61843, Proceedings of the ASME 2021 Fluids Engineering Division Summer Meeting, August 10 - 12, 2021, Online, VirtualConference (2021).
- N Dudu*, C Harris, A rodriguez*, J Terrazas*, R Adansi*,VMK Kotteda, **V Kumar,** "Fractal and Convolutional Analysis for DeepAtmospheric Turbulence Using Machine Learning", FEDSM2021-65798, Proceedings of the ASME 2021 Fluids Engineering Division Summer Meeting, August 10 - 12,2021, Online, Virtual Conference (2021).
- B Paez*, A Rodriguez*, J Terrazas*, R Adansi*,VMK Kotteda, **V Kumar,** "Aerodynamic Optimization of Design for a Co2 Dragster", FEDSM2021-65793, Proceedings of the ASME 2021 Fluids Engineering Division Summer Meeting, August 10 - 12, 2021, Online, Virtual Conference (2021).
- J Terrazas*, A Rodriguez*, R Adansi*, **V Kumar**, VMK Kotteda, "Physics-Informed Neural Network to Predict Flow CharacteristicsDuring Water Braking in Hypersonic Conditions", Proceedings of the ASME 2021 Fluids Engineering Division Summer Meeting, August 10 - 12,2021, Online, Virtual Conference (2021).
- J Aguilar*, L. Sandoval*, A Rodriguez*, Sanjay Shantha-Kumar, J. Terrazas*, R Adansi*, V Kumar, VMK Kotteda, "A CNN with deep learning for non-equilibrium characterization of al-sm melt infusion into a b4c packed bed", FEDSM2021-65794, Proceedings of the ASME 2021 Fluids Engineering Division Summer Meeting, August 10 - 12,2021, Online, Virtual Conference (2021).

2020

- C Harris, VMK Kotteda, SS Kumar, *V Kumar,* A Bronson, *"*An Analysis of the Effect of Contact Angle on the Liquid Metal Infusion into a Packed Bed" Metallurgical and Materials Transactions B (2020).

- VMK Kotteda, A Kommu, **V Kumar**, "Characterization of Flow Regimes In Gas-Solid Fluidized Beds Via a Data-DrivenFramework", ASME 2020 Fluids Engineering Division Summer Meeting, July 12 - 16, 2020, Orlando, FL, USA
- A Rodriguez*,VMK Kotteda, LF Rodriguez*, **V Kumar,** JA Munoz, "Trilinos Solvers Scalability on A MFiX-Trilinos Framework AppliedTo Fluidized Bed Simulations",ASME 2020 Fluids Engineering Division Summer Meeting, July 12 - 16, 2020, Orlando, FL, USA.
- A Rodriguez*, CR Cuellar, LF Rodriguez*, A Garcia, VSRao Gudimetla,VMK Kotteda, JA Munoz, **V Kumar,** "Stochastic Analysisof LES Atmospheric Turbulence Solutions with Generative Machine Learning Models",ASME 2020 Fluids Engineering DivisionSummer Meeting, July 12 - 16, 2020, Orlando, FL, USA.
- VMK Kotteda, A Badhan*, **V Kumar,** "Parametric Optimization of a Dry Powder Inhaler,ASME 2020 Fluids EngineeringDivision Summer Meeting, July 12 - 16, 2020, Orlando, FL, USA.
- **V Kumar**, J Terrazas*, R Edmonds*, VMK Kotteda "Multiphase CFD Modeling of the Braking Phenomena for the Holloman High-Speed Test Track", 23rd AIAA International Space Planes and Hypersonic Systems and Technologies Conference, March10-12, 2020, Montréal, Québec, Canada.

2019
- VKotteda[#], **V. Kumar**, W. Spotz, J. Stephens, "Uncertainty quantification of fluidized beds using a data driven framework", 709-718 (354), Powder Technology (2019), https://doi.org/10.1016/j.powtec.2019.06.021
- VK Kotteda[#], A. Schiaffino*, A. Chattopadhyay*, S. Shantha-Kumar, V. **Kumar**, A. Bronson, *Sensitivity of viscosity on molten Ti infusion into a B4C packed-bed at the microscale,*" Metallurgical and Materials Transactions B (2019). https://doi.org/10.1007/s11663-019-01618-9.
- D. Lozano*, VM Kotteda[#], V. **Kumar**, V. Gudimetla, "*Implementing artificial intelligence in predicting metrics for characterizing laser propagation in atmospheric turbulence*", 141(12), Journal of Fluids Engineering, (2019), doi:10.1115/1.4043706.
- PM Delgado*, VM Kotteda[#], V. **Kumar**, "Hybrid fixed-point fixed-stress splitting method for linear poroelasticity", Advances in Computational Geomechanics, 9(1), 29 (2019), https://doi.org/10.3390/geosciences9010029
- A. Schiaffino*, VMK Kotteda[#], V. **Kumar**, A. Bronson, S. Shantha-Kumar, "Uncertainty quantification of molten hafnium infusion into a b4c packed bed", ASME AJKFLUIDS2019-5281 (2019)
- J. Terrazas*, V. Kotteda[#], V. **Kumar**, R. Edmonds, M. Zeisset, "CFD modeling of the water braking phenomena for the Holloman High-Speed Test Track", ASME AJKFLUIDS2019-5506 (2019)
- A. Badhan*, VMK Kotteda[#], V. **Kumar**, "CFD DEM analysis of a dry powder inhaler", ASME AJKFLUIDS2019-4771 (2019)
- VMK Kotteda#, A. Kommu, **V. Kuma**r, W. Spotz, "*Uncertainty quantification of a fluidized bed reactor*", ASME AJKFLUIDS2019-4844 (2019)
- L Rodriguez*, **V Kumar**, J Espiritu, A. Bronson, VMK Kotteda[#], D. Lozano, A. Rodriguez, "*Branch and bound analysis to characterize phase variations in laser propagation through deep turbulence*", ASME AJKFLUIDS2019-5567 (2019)

2018
- V. Kotteda[#], **V. Kumar**, W. Spotz, "Performance of preconditioned iterative solvers in MFiX-Trilinos for fluidized beds", Journal of Supercomputing, 1-23 (2018)
- V. Kotteda[#], V **Kumar** and W Spotz, Performance portability of a fluidized bed solver, IEEE High Performance Extreme Computing Conference (HPEC), Sep 25-27, 2018, Waltham, MA USA
- D. Lozano*, V. **Kumar**, V. Gudimetla, "Characterization of Laser Propagation Over a Long Path through Atmospheric Turbulence", SPIE Defense & Security, SI18D_10637-42 (2018)
- D. Lozano*, V. **Kumar**, V. Gudimetla, V Kotteda, "Artificial Intelligence to predict metrics for characterizing laser propagation in atmospheric turbulence", ASME Fluids Engineering Division Summer Meeting, FEDSM2018-83209 (2018)
- J. Contreras-Serna*, A. Schiaffino*, V Kotteda, A. García-Cuellar, V. **Kumar**, "Numerical simulation of formation of melt jets in melt-coolant interactions", ASME Fluids Engineering Division Summer Meeting, FEDSM2018-83273 (2018)
- Z. Nieto*, V. Kotteda, A. Rodriguez*, S. Shantha-Kumar, V. **Kumar**, A. Bronson, "Utilization of machine

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learning to predict the surface tension of metals and alloys", ASME Fluids Engineering Division Summer Meeting, FEDSM2018-83248 (2018)

- A. Schiaffino*, V Kotteda, A. Bronson, S. Santha-Kumar, V. **Kumar**, "Predicting The Depth Of Penetration Of Molten Metal Into A Pore Network Using Tensorflow", ASME Fluids Engineering Division Summer Meeting, FEDSM2018-83258 (2018)
- A. Rodriguez*, V. **Kumar**, A. Schiaffino*, V Kotteda, Z. Nieto*, L. Rodriguez*, "Machine learning approach to predict the flow rate for an immiscible two-phase flow at pore scale for enhanced oil recovery application", ASME Fluids Engineering Division Summer Meeting, FEDSM2018-83050 (2018)
- T. Hussain, A Chattopadhyay, A Schiaffino, V Kotteda and V Kumar, Optimization of Micro-Pillar Wick Structured Cooler by using an Exa-scale Pore Network Simulator, 2018 Rice oil and gas high performance computing, Rice University, Houston, TX (2018)

2017
- D. Lozano*, V. **Kumar**, V. Gudimetla, "Investigating metrics based on Phase variance for atmospheric turbulence effects on a 10km Laser beam propagation path", Advanced Maui Optical and Space Surveillance Technologies Conference (2017)
- V. Kotteda and V Kumar, Effect of air-fuel ratio on biomass gasification, 44th National Conference on Fluid Mechanics and Fluid Power (2017), December 14-16, Amrita University, Kollam.
- V. Kotteda, A. Chattopadhyay*, V. **Kumar**, W. Spotz, "Next-generation multiphase flow solver for fluidized bed applications", ASME Fluids Engineering Division Summer Meeting, FEDSM2017-69555, (2017)
- A. Schiaffino*, A. Chattopadhyay*, H. Hossain*, V. **Kumar**, V. Kotteda, A. Bronson, "Computational study of high temperature liquid metal infusion", ASME Fluids Engineering Division Summer Meeting, FEDSM2017-69577, (2017)

2016
- S. Afrin*, J. Dagdelen, Z. Ma, V. **Kumar**, "Application of sol-gel method as a protective layer on a specular reflective surface for secondary reflector in a solar receiver", ASME POWERENERGY2016-59046 (2016)
- A. Chattopadhyay*, V. **Kumar**, V. Kotteda, W. Spotz, "Next generation exascale capable multiphase solver with Trilinos", ASME IMECE2016-67962 (2016)
- V. Kotteda, A. Chattopadhyay*, V. **Kumar**, W. Spotz, A Framework to Integrate MFiX with Trilinos for High Fidelity Fluidized Bed Computations, 2016 IEEE High Performance Extreme Computing (HPEC) (2016)
- A. Chattopadhyay*, V. **Kumar**, V. Kotteda, W. Spotz, Leveraging Trilinos's Next Generation Computing Framework for an Exa-Scale Poro-Elastic Network Simulator Implementation, 2016 IEEE High Performance Extreme Computing (HPEC) (2016)

2015
- **V. Kumar**, C. K. Harris, A. Bronson, S. Shantha-Kumar*, A. Medina*, "High Temperature Liquid Metal Infusion Considering Surface Tension-Viscosity Dissipation", Metallurgical and Materials Transactions B, DOI: 10.1007/s11663-015-0518-4 (2015).
- P. Delgado*, **V. Kumar**, "A stochastic Galerkin approach to uncertainty quantification in poroelastic media", Applied Mathematics and Computation, V266, pp 328–338 (2015)
- K. K. Katta*, R. Nair, V. **Kumar**, "High-order finite-volume schemes for shallow water model on the cubed-sphere: Comparison between split and unsplit two-dimensional schemes", Applied Mathematics and Computation, 266, 316–327 (2015).
- K. K. Katta*, R. Nair, **V. Kumar**, "High-Order Finite Volume Transport on the Cubed-Sphere: Comparison between 1D and 2D Reconstruction Schemes", *Monthly Weather Review*, V143, pp2937-2954 (2015)
- N. Agarwal, E. Barnes, **V. Kumar**, "Treatment Planning for Individuals with Lupus: Case Conceptualization Using the DOACLIENTMAP Framework", *J. Applied Rehabilitation Counseling,* Vol. 46, No. 1 (2015)
- N. Agarwal, N. Yasui, **V. Kumar**, "Vocational rehabilitation for individuals with lupus", *Journal of Vocational Rehabilitation,* 43-1, 83-90 (2015)

2014
- N. Hossain*, S. Afrin*, J. Ortega*, **V. Kumar**, D. Banerjee, "Numerical analysis of total energy storage of

nanofluidized heat transfer fluid in thermocline thermal energy storage system", ASME ES-FuelCell2014-6451 (2014)

- S. Afrin*, J. Ortega*, C. Ho, **V. Kumar**, "Modeling of a High-Temperature-Serpentine External Tubular Receiver Using Supercritical CO2", ASME ES-FuelCell2014-6376 (2014)
- P. Delgado*, V. Kumar, "A stochastic galerkin approach to uncertainty quantification in poroelastic media", ASME FEDSM2014-21577 (2014)
- V. **Kumar**, A. Castellanos*, J. Ortega*, V. Tandon, N. Agarwal, V. Udoewa, A. Kumar, S. Prasad, "Dynamic learning framework: adaptive assessment development for the undergraduate fluid mechanics", ASME FEDSM2013-21718 (2014)

2013

- **V. Kumar**, S. Afrin*, J. Ortega*, A. Sepulveda*, L. D Juan*, A. Jesus*, A. Dante*, H. Lu, "Development and evaluation of a prototype concentrating solar collector with thermocline based thermal energy storage for residential thermal usage", *Journal of Renewable and Sustainable Energy*, 5, 053144 (2013)
- S. Afrin*, **V. Kumar**, D. Bharathan, G.C. Glatzmaier, Z. Ma., "Computational analysis of a pipe flow distributor for a thermocline based thermal energy storage system", *Journal Solar Energy Engineering,* 136(2), 021010, (2013)
- N. Agarwal, B. Calvo, **V. Kumar**, "Paving the Road to Success: A Students with Disabilities Organization in a University Setting", *College Student Journal*, V48-1, 34-44, (2013)
- S. Afrin*, J.D. Ortega*, **V. Kumar**, D. Bharathan, A computational analysis: A honeycomb flow distributor with porous approximation for a thermocline thermal energy storage system. ESFULECELL2013-18342 (2013)
- A. Sepulveda, S. Shantha-Kumar, **V. Kumar**, A. Bronson, Z. Ma, "Feasibility Studies of Encapsulated Fluidized Particles with Phase Change Materials as High Temperature (1200ºC) Heat Transfer Fluid for the Solar Tower", ASME FEDSM2013-16151 (2013)
- **V. Kumar**, S. Afrin, J.D. Ortega, V. Udoewa, C. Ramana, "Touchpad in education: Dynamic learning framework and content development for the undergraduate fluid mechanics using Bloom's taxonomy of cognitive learning concepts", ASME FEDSM2013-16257 (2013)
- J.Ortega*, S. Afrin*, **V. Kumar**, J. Gomez, A Computational Analysis on the Impact on the Effective Thermal Properties of a Nano-fluidized in a Single-Tank Thermocline Solar Salt Thermal Energy Storage System., ASME FEDSM2013-16434, Incline Village, NV (2013)
- P. Delgado* and **V. Kumar**, "Generalization of a Heterogeneous Multiscale Framework Coupling Discrete Microscale and Continuous Macroscale Physics in a Porous Medium", ASME FEDSM2013-16033, Incline Village, NV (2013)

2012

- E. Busquets*, **V. Kumar**, J. Motta*, R. Chacon*, & H. Lu, "Thermal Analysis and Measurement of a Solar Pond Prototype to Study the Non-convective Zone Salt Gradient Stability", *Journal of Solar Energy*, 86-5, 1366–1377 (2012)
- S. Afrin*, E. Cordero, S. Rosa, **V. Kumar**, D. Bharathan, G.C. Glatzmaier, Z. Ma., "Computational analysis of a pipe flow distributor for a thermocline based thermal energy storage system", ASME 6th International Conference on Energy Sustainability, ESFuelCell2012-91069, San Diego, CA (2012)
- P. Delgado, **V. Kumar**, R. Romero, "A Parallel Framework for Solving Coupled Network and Continuum Scale Models in a Porous Media", Interpore Conf, Purdue University (2012)

2008-2011

- J. Potvin, K. Bergeron, G. Brown, R. Charles, K. Desabrais, H. Johari, **V. Kumar**, M. McQuilling, A. Morris, G. Noetscher, B. Tutt, "The Road Ahead: A White Paper on the Development, Testing and Use of Advanced Numerical Modeling for Aerodynamic Decelerator Systems Design and Analysis", *AIAA-2011-2501*, as *a position paper on the state-of-art of FSI technologies by the AIAA-ADS Technical Committee* (2011)
- P. Delgado*, F. Chen*, **V. Kumar**, C. Harris, K. Katta*, "Simulation of single and two phase newtonian flow in carbon capture and storage processes using variational methods, Mathematics and Engineering HUIC Conference (2011)

- **V. Kumar**, F. Chen*, P. Delgado*, N. Kavoori*, K. Katta*, C. Harris, "Simulation of single and two phase Newtonian flow in carbon capture and storage processes using variational methods", CO2-Sequestration Conference, Pittsburgh (2011)
- U. Parimi*, **V. Kumar**, H. F. Janssen, V. Udoewa: Fluid Analysis of the Deep Veins to Analyze the Chances of Formation of a Deep Vein Thrombosis (DVT), ASME, 5th Frontiers in Biomedical Devices - BioMed2010-32071 (2010)
- J. Valles*, **V. Kumar**, G. Aceves*, U. Parimi*, "Two Dimensional Planes Analysis Using LSDYNA", White Sands Conference (2009)

Prior to 2008
- R. Wolf, **V. Kumar**, F. Toffoleto, G. Erickson, A. Savoie, C. Chen and C. Lemon, "Estimating Local Plasma Sheet $PV^{5/3}$ from Measurements on a Single Spacecraft", *J. Geophysical Review*, Vol. 111, No. A12 (2006).
- K. Stein, T. Tezduyar, **V. Kumar**, S. Sathe, R. Benney, E. Thornburg, C. Kyle and T. Nonoshita, "Aerodynamic Interactions Between Parachute Canopies", *Journal of Applied Mechanics*, 70, 50-57(2003)
- S. Mittal and **V. Kumar**, "Vortex-Induced vibrations of a pair of cylinders at Reynolds number 1000", *International Journal of Computational Fluid Dynamics*, 1-14(2003)
- S. Mittal and **V. Kumar**, "Flow-Induced Oscillations of Two Cylinders in Tandem and Staggered Arrangement", *Journal of Fluids and Structures*, 15, 717-36(2001)
- S. Mittal and **V. Kumar**, "Flow-Induced vibrations of a light Circular Cylinder at Reynolds numbers 103 to 104 ", *Journal of Sound and Vibrations*, 245-5, 923-46(2001)
- S. Mittal and **V. Kumar**, "Finite Element study of vortex induced cross-flow and in-line oscillations of a light Circular Cylinder at low Reynolds numbers", *International Journal for Numerical Methods in Fluids*, 31-7, 1087-1120(1999)
- S. Mittal, **V. Kumar** and A. Raghuvansi, "Unsteady incompressible flows past two cylinder in tandem and staggered arrangements", *International Journal for Numerical Methods in Fluids,* 25, 1315-44(1997)
- F. Toffoletto, RA Wolf, S Sazykin, RW Spiro, **V Kumar**, "Investigations of Interchange stability using the RCM-E", American Geophysical Union, San Francisco, 2006
- C. Lemon, M. Chen, TP O'Brien, F Toffoletto, S Sazykin, R Wolf, **V Kumar**, "The evolution of the storm-time ring current in response to different characteristics of the plasma", American Geophysical Union, San Francisco, 2006
- K.R. Stein, T.E. Tezduyar, **V. Kumar**, S. V. Sathe, R.J. Benney and R.D. Charles, "Numerical Simulation of soft landing for clusters of cargo parachutes", in Proceedings of the ECCOMAS Computational Fluid Dynamics Conference (eds. P. Neittaanmaki, T. Rossi, S. Korotov, E. Onate, J. Periaux, and D. Knorzer), Jyvaskyla, Finland (2004)
- K. Stein, T. Tezduyar, S. Sathe, M. Senga, C. Ozcan, T. Soltys, **V. Kumar**, R. Benney, and R. harles, "Simulation of Parachute Dynamics During Control Line Input Operations", in Proceedings of 17th AIAA Aerodynamic Decelerator Systems Technology Conference, AIAA Paper, 2003-2151, Monterey, CA (2003)
- R. Charles, R. Benney, K. Stein, T. Tezduyar, S. Sathe, M. Senga, C. Ozcan, T. Soltys, **V. Kumar**, M. Accorsi, Z. Xu, B. Zhou, "Airdrop simulations of controlled parachute descents", in Proceedings of Defense High Performance Computing Modernization Program Users Group Conference, Bellevue, Washington (2003)
- Benney, K. Stein, T. Tezduyar, R. Keedy, **V. Kumar**, S. Sathe, M. Senga, V. Udoewa, M. Accorsi, Z., B. Zhou, and H. Johari, " Airdrop Systems Modeling: Methods, Applications, and Validations", in Proceedings of DoD High Performance Computing Modernization Program Users Group Conference, Austin, Texas, (2002)
- K. Stein, R. Benney, T. Tezduyar, **V. Kumar** et al., "Aerodynamic Interactions Involving Multiple Parachute Canopies", in Proceedings of the 16th AIAA Aerodynamic Decelerator Systems Technology Conference, AIAA Paper 2001-2004, Boston, MA (2001)
- T. Tezduyar, **V. Kumar** et al., "Aerodynamic and Fluid-Structure Interactions of Multiple Parachute Canopies", Computational Technologies for Fluid/Thermal/Chemical/Stress Systems with Industrial Applications (eds. C.R. Kleijn and V. Kudriavtsev), PVP-Vol. 424-2, ASME, 127-139, NY (2001)
- K. Stein, R. Benney, T. Tezduyar, **V. Kumar**, E. Thornburg, C. Kyle and T. Nonoshita, "Aerodynamic Interaction Between Multiple Parachute Canopies", in Proceedings of the First MIT Conference on Computational Fluid and Solid Mechanics, Boston, MA (2001)
- T. Tezduyar, Y. Osawa, K. Stein, R. Benney, **V. Kumar** and J. McCune, "Computational Methods for

Parachute Aerodynamics", Computational Fluid Dynamics for the 21st Century (eds. M. Hafez, K. Morinishi and J. Periaux), Springer (2001)

- T. Tezduyar, Y. Osawa, K. Stein, R. Benney, **V. Kumar** and J. McCune, "Numerical Methods for Computer Assisted Analysis of Parachute Mechanics", in Proceedings of 8th International Conference on Numerical Methods in Continuum Mechanics, Liptovsky Jan, Slovakia, CD-ROM (2000)
- **V. Kumar** and S. Pavithran, "Turbulent flow in Two-Dimensional U-ducts : A computational analysis", ASME PVP Conference, August 1-5, Boston, MA (1999)
- **V. Kumar** and S. Mittal, "Flow Induced Vibration of single Multiple cylinders", The Seventh Asian Congress of Fluid Mechanics, 585-88, December 8-12, IIT Madras, Chennai, India (1997)

Chapters in Books

- "Fluid-Structure Interaction Techniques for Parachute" by **Vinod Kumar** and Victor Udoewa in the book "Fluid Dynamics, Computational Modeling and Applications," edited by L. Hector Juarez, ISBN 978-953-51-0052-2, InTech, February 2, 2012 (2012).
- "Computational Fluid Dynamics" by Victor Udoewa and **Vinod Kumar** in the book "Applied Computational Fluid Dynamics" edited by Hyoung Woo Oh, ISBN 978-953-51-0271-7, InTech, March 3, 2012 (2012).

Reports or Monographs (needs updating)

- V Kumar,VMK Kotteda, W Spotz, High Fidelity Computational Model for Fluidized Bed Experiments. DOE-FE0026220, 2018,United States.
  DOI: https://doi.org/10.2172/1591767, https://www.osti.gov/biblio/1591767
- V. Kumar, "Laser beam propagation through a long path: Developing new metrics for deep turbulence effects", AFOSR SFFP Summer Report (AFRL Mentor: Dr. Gudimetla, KAFB/Maui), Summer 2016.
- V. Kumar, "Analysis of Strong Turbulence Effects on Laser", AFOSR SFFP Summer Report (AFRL Mentor: Dr. Gudimetla, KAFB/Maui, Graduate Student: T. Dorethy), Summer 2012.
- V. Kumar, "Computational analysis of flow distributor and thermocline for a single tank thermal energy storage system", submitted to the National Renewable Energy Laboratories (Mentors: Greg Glatzmaier, Desikan Bharathan, Zhiwen Ma), Summer 2011.
- V. Kumar, "Overcoming the barrier to ultrascale climate simulation: developing high order schemes for shallow water equations", submitted to Oak Ridge National Laboratories (Mentors: James "Trey" White III, J. Drake, K. Evans), Summer 2009
- Technical Research Reports Submitted to Sandia (Fall 2010)
- Technical Quarterly/annual progress research reports to DOE – NETL.
- Technical Quarterly/annual progress research reports to DOE –NREL.

Abstracts/Other Scholarly Contributions (needs updating)

- V. Kumar, Data-driven predictive framework for legacy CFD solvers with Trilinos, Dakota, & Tensorflow, Technical talk at Army Armament Research, Development and Engineering Center (ARDEC), July 2018
- V. Kumar, HPC Perspective: CFD Modeling of Water Braking Phenomena, DoD HPC Users Group Meeting, Wright-Patterson Air Force Base (WAFB), Dayton, OH, September 2018
- V. Kumar, CFD Modeling of Water Braking Phenomena, Holloman Air Force Base, Alamogordo, NM, August 2018
- VMK Kotteda, V Kumar, W Spotz, Dakota Integrated with MFiX for UQ Analysis: Sensitivity of particle size on pressure in a fluidized bed DEM simulations, National Energy Technology Laboratory's (NETL) 2018 Workshop on Multiphase Flow Science, August 7 -9, 2018, Houston, TX.
- VMK Kotteda, V Kumar, W Spotz, A Rodriguez, A Schiaffino and A Chattopadhyay, MFiX Integrated with Trilinos: First and second generation preconditioned linear solvers performance analysis, National Energy Technology Laboratory (NETL) 2018 Workshop on Multiphase Flow Science, August 7 -9, 2018, Houston, TX.
- VMK Kotteda, V Kumar and W Spotz, Trilinos, Linear Solver integrated in MFiX, a Fortran based Multiphase Solver from NETL, Trilinos User-Developer Group meeting 2017, October 23-26, 2017, CSRI Sandia National Laboratory, Albuquerque, NM

- VMK Kotteda, V Kumar, W Spotz, A Rodriguez, A Schiaffino and A Chattopadhyay, Linear Solver Performance Analysis of MFiX Integrated with a Next Generation Computational Framework, National Energy Technology Laboratory (NETL) 2017 Workshop on Multiphase Flow Science, August 8 -10, 2017, Morgantown, WV
- A. Chattopadhyay, A. Schiaffino, V. Kotteda, V. Kumar, W. Spotz, "High Fidelity Computational Model for Fluidized Bed Experiments," Poster, 2016 Crosscutting Research & Rare Earth Elements Portfolios Review, April 2016.
- K. Katta, R. Nair, V. Kumar, "High-Order Central Finite-Volume Schemes for Linear Transport Problem on Cubed Sphere", SIAM Conference on Parallel Processing for Scientific Computing, Savannah, Georgia, USA (Feb 15-17, 2012).
- A. Cabral, S. Afrin, V. Kumar, "Comp. Analysis of Flow Distribution for a One Tank Thermal Energy Storage System", 3rd Southwest Energy Science & Engg Sym, Spring 2013
- A. Rios, J. Ortega, V. Kumar, "Numerical Analysis of Total Energy Storage of Nanofluidized Heat Transfer Fluid In Thermocline Thermal Energy Storage System", 3rd Southwest Energy Science and Engineering Symposium, Spring 2013
- M. Chaidez, S. Afrin, V. Kumar, "Numerical Analysis of Total Energy Storage of Nanofluidized Heat Transfer Fluid in Thermocline Thermal Energy Storage System", 3rd Southwest Energy Science and Engineering Symposium, Spring 2013
- D. Llausas, P. Delgado, V. Kumar, "Pore Network Model Construction from CT Scanned Rock Samples for Carbon Sequestration Simulation", COURI Symp., Spring 2012, 04/2012
- S. Rosa, A. Sepulveda, V. Kumar, "Feasibility Analysis of Solid Particles as a Thermal Energy Storage Medium Using Fluidization Process", COURI Symp., Spring 2012, 04/2012
- Eduardo Cordero, Jesus D. Ortega, Dustin Crandall, Grant Bromhal, Vinod Kumar, "Computational Simulations of Carbon Dioxide Flow in Porous Media for Carbon Sequestration Applications", COURI Symposium, Spring 2012, 04/2012
- C. L. Guevara, K. Kumar, V. Kumar, "High Fidelity Thermocline Tracking Algorithm Using Weighted Essentially Non-Oscillatory Schemes", COURI Symposium, Spring 2012, 04/2012
- Jesus D. Ortega, Vinod Kumar, "Computational Models of Sub-Divided Thermal Energy Storage Tanks used in Concentrating Solar Power Plants with Parabolic Trough Collectors", COURI Symposium, Spring 2012, 04/2012
- S. Afrin, V. Kumar, "Model of a Pipe Flow Distributor for Single Tank Thermocline Thermal Storage System", 2nd Southwest Energy Science & Engg. Symp., Spring 2012
- P. Delgado, V. Kumar, "Parallel Stochastic Multiscale Modeling of Single Phase Flow Through a Porous Media for Carbon Sequestration Risk Assessment", 2nd Southwest Energy Science and Engineering Symposium, Spring 2012
- E. Cordero, J. Ortega, P. Delgado, V. Kumar, D. Crandall, G. Bromhal, "Fluent Simulations for Fluid Flow in Porous Media for Carbon Sequestration Application", 2nd Southwest Energy Science and Engineering Symposium, Spring 2012
- K. Katta, R. Nair, V. Kumar, "Central Finite-Volume Schemes in Global Atmospheric Models", 2nd Southwest Energy Science and Engineering Symposium, Spring 2012
- V. Kumar, M. Taylor, K. Katta*, "Streamline upwinding schemes for consistence hyperviscosity coefficients in HOMME", Poster, 16th Annual CESM Workshop, (2011)
- S. Afrin, V. Kumar, P. Delgado, F. Chen, and K. Katta, "Point site selection for sequestering CO2: determining the impact of an earthquake on seal integrity of a reservoir cap-rock", 1st Southwest Energy Science and Engineering Symposium (SESES), Spring 2011
- C. Barraza, U. Parimi, V. Kumar, "Computational fluid dynamics and veins", 1st Southwest Energy Science and Engineering Symposium, Spring 2011
- E. Busquets, R. Chacon, G. Ceballos, V. Kumar, and H. Lu, "Computational thermal analysis and measurement of the salt Gradient stability in a solar pond", 1st Southwest Energy Science and Engineering Symposium, Spring 2011
- R. Chacon and V. Kumar, "Fundamental study of a beam vibration frequency", 1st Southwest Energy Science and Engineering Symposium, Spring 2011
- F. Chen, K. Kavoori, K. Katta, P. Delgado, V. Kumar, C. Harris, "Applied variational methods for simulation of Newtonian flow through porous spaces", 1st Southwest Energy Science and Engineering Symposium, Spring 2011

- K. Katta, V. Kumar, "A Third-Order Non-Oscillatory Transport Scheme for Atmospheric Modeling", 1st Southwest Energy Science and Engineering Symposium, Spring 2011
- N. Kavoori, F. Chen, V. Kumar, & C. Harris, "A variational approach to one phase non-newtonian flow in circular duct", 1st Southwest Energy Science & Engg Symp., Spring 2011
- J. Motta-Mena, E. Busquets, and V. Kumar, "Scalable three-dimensional geometry preprocessor for molecular dynamics analysis", 1st Southwest Energy Science and Engineering Symposium, Spring 2011
- J. Valles, C Barraz, V. Kumar and K Kiran, "Computational fluid dynamics for parachute analysis", 1st Southwest Energy Science and Engineering Symposium (SESES), Spring 2011
- Katta, K., Poster presentation on "Climate Simulations with CAM-HOMME: High Order Schemes for Advection Dominated Flow", Building Partnerships and Pathways to Address Engineering Grand Challenges Conference, UTEP, El Paso, TX, USA (Feb 8, 2010).
- V. Kumar, N. Kavoori, K. Katta, F. Chen, P. Delgado, C. Harris, "Validation of Variational Method to Simulate Single and Two Phase Newtonian Flow through Angular Pores", 9th Joint UTEP/NMSU Workshop on Mathematics, Computer Science, and Computational Sciences, New Mexico State University, Las Cruces, NM, USA (April 2, 2011).
- V. Kumar, F. Chen, P. Delgado, N. Kavoori, K. Katta, C. Harris, "Simulation of single and two phase Newtonian flow in carbon capture and storage processes using variational methods", CO2-Sequestration Conference, Pittsburgh (May 2011).

COLLABORATORS *(needs updating)*
W. Spotz, T. Smith, M. Taylor, C. Ho, S. Collis (Sandia National Labs); G. Glatzmaier, Z. Ma, D. Bharathan, J. Gomez(NREL); D. McIntyre, G. Bromhal, D. Crandall (NETL); R. Nair (NCAR); J. White, J. Drake & K. Evans (ORNL); G. Rao(KAFB/Maui); V. Balaji (GFDL/Princeton University); C. Harris (Shell Oil Company); A. Garcia & C. Rivera (Monterrey Tech, Mexico); S. Mittal, S. Kumar (IIT Kanpur); R. Raj, K. Khan(IIT Patna); F. Toffoletto & R. Wolf (Rice University, Physics & Astronomy); P. Jaiswal (Oklahoma State University); D. Banerjee (Texas A&M); A. Bronson, V. Tandon, , N. Sharma, B. Joddar, P. Prabhakar (UTEP)

My PhD adviser: Prof. Richard Tapia, Computational and Applied Math & University Professor, Rice University
My Postdoc/research adviser: Profs Toffoletto & R. Wolf, Physics & Astronomy, Rice University
Dr. V. Balaji, GFDL, Princeton University

Advisee: (Bold implies "current") (Year Graduated, Current affiliation if known)
  Postdoc: Dr. Murali R. Kotteda, 2016 **-** 2019
  Doctor of Philosophy (**Ph.D.**):
    ○ Arturo **Rodriguez**, PhD Candidate, Mechanical Engineering (expected 2023)
    ○ Richard **Adansi**, PhD Candidate, Mechanical Engineering (expected 2023)
    ○ Jose A. **Terrazas**, PhD Candidate, Mechanical Engineering (expected 2022)
    ○ Dr. Luis F. R. Sanchez, Mechanical Engineering (2020)
    ○ Dr. Antara Badhan, Environmental Science (2019)
    ○ Dr. S. Afrin, Energy track - ESE (2015, currently Assistant Professor, East Tennessee State University)
    ○ Dr. P. Delgado, Computational Science (2015, currently at Sandia National Labs)
    ○ Dr. A. Sepulveda, Energy track - ESE (2015)
    ○ Dr. Kiran Katta, Computational Science (2012, also first Doctoral student from CPS)
  Master of Science (**M.S.**):
    Daniel V. **Luna** (expected Summer 2022), Clinton **Chijioke** (expected Summer 2022), , T. Hossain (CPS, 2019), A. Schiaffino (ME, 2018), D. Lozano (ME, 2018, NNSA), A. Chattopadhyay (CPS, 2017, Rice), N. Hossain (CPS, 2015, U. Houston), J. Ortega (ME, 2014, Sandia), T. Dorethy (CPS, 2014, U.S. Air Force), S. Afrin (ME, 2012, E.Tenn), P. Delgado (CPS), K. Katta (CPS, 2011), J. Valles (ME, 2011, U.S. Army), U.Parimi (2010), N. Kavoori (ME, 2010)

  Undergraduate Research Assistants (**UG RA**):
    Rafael Baez, Esperanza, Leslie Trevizo, A. Tandon, J. Aguilar, B. Paez, N. Dudu, Alan Roscon, A. Rodriguez, Z. Nieto, G. Singh, A. Schiaffino, Robles, M. Chaidez, A. Cabral, R. Millis, Gomez, Alexandra, Betancis, Alvillar,

Llauhas, Rosa , Ortega , Cordero, Guevera, Landis, Barraza , Busquestes, Chacon, Presa , Sam, Corral, Mijares, Valles, Rodriguez, Corral, Brown, Alvarez, Braulio, Ana

TEACHING ACCOMPLISHMENT (needs updating)
Courses Taught/Developed

Fundamentals of Fluid Dynamics (MECH3354, Spring 2008, Fall 2008), Theory of Finite Element Methods/Analysis - FEM/FEA (MECH5390, Fall 2009), Computational Fluid Dynamics/CFD (MECH5390, Spring 2010), Numerical Methods for Climate Models (MECH5390, Fall 2010), Energy Use and Climate Change (ESE6318, Fall 2010), Engineering Analysis I (Differential Equations - MECH2351, Spring 2011), Engineering Analysis II (Computer programming & Numerical Methods - MECH3352, Spring/Fall 2012/13/14/15/16/17), Adv. Mathematics (MECH5390 & CE6303, Spring 2011), Multiphysics Concepts for Mechanical Engineering Problems (Special topics - MECH5390, Spring 2017)

Education-related External Funding, Honors and Awards
- V. Kumar (PI),"Adaptive Renewable Energy Course Modules Using DOE's System Advisor Model in Cloud Computing Framework", <u>IBM</u>, Industry, 01/12-12/12, $10,000.
- A. Choudhuri (PI), N. Love (CO-PI), C. Ramana (CO-PI), E. Shafirovich (CO-PI), V. Kumar (CO-PI), H. Meeuwsen (CO-PI), "Graduate assistance in areas of national need (GAANN) program", <u>US Department of Education</u>, Federal, 08/16/2012-08/15/2015, $399,798.
- L. Everett (PI), V. Kumar (CO-PI, Support for 2 Students), "Students set the PACE to increase engineering graduates", 4 UG RA Support, Student Employment Program, 09/01/11-08/31/12, $31,006 (estimated).
- P. Delgado (PhD Thesis Adviser: V. Kumar), NSF-LSAMP Fellowship for Doctoral Study in Computational Science Program, 2011-2014.
- L. Everett (PI), J. Chessa (CO-PI), V. Kumar (CO-PI, 2 Students), "Students set the PACE to increase engineering graduates", 6 UG RA Support, Student Employment Program, 09/01/09-08/31/10, $47,000.
- L. Everett (PI), V. Kumar (CO-PI, 2 Students), "Students set the PACE to increase engineering graduates", 5 UG RA Support, Student Employment Program, 09/01/10-08/31/11, $39,000 (estimated).
- Outstanding Service to students, TRiO (2008)

SERVICE AND HONORS (needs updating)
Professional Honors, Prizes, Fellowships (needs to update)
- Session chair –Emerging Technologies - Internet of Things session, ASME IMECE (2016),
- Selected for the AFOSR Summer Faculty Fellowship Program (2012, 16, 17, 20, 21),
- Selected for the DOE – FaST NREL Fellowship (2011),
- Selected for the DOE FE NETL Fellowship (2010),
- Selected for the DOE ORNL Fellowship (2009),
- Nominated by the dean of COE for the Frontiers of Engineering Education (2013),
- Selected for the National Effective Teaching Institute (NETI) (2012),
- Nominated by the dean of COE for the NETI (2011),
- Appointed to serve in the Faculty Senate as a Student Conduct Committee for CoE (2012-13).
- Awarded postdoctoral fellowship, Physics & Astronomy, Rice Univ. (2005 – 2007),
- Sallyport Award for extraordinary contributions to the Rice University (2005),
- Robert Lowry Patten Award for outstanding contributions to graduate student (2005),
- Certificate of Recognition by Rice University's president in appreciation for outstanding leadership on behalf of the South Asia Tsunami victims (2004),
- Prize winner in a wildlife photography competition organized by the Valley Land Fund for conserving the lower Rio-Grande wildlife (2002),
- AIAA Achievement Certificate for organizing "Physics is fun" autographed by childhood hero & the man from moon "Buzz Aldrin" (2000),
- Awarded Research Assistantship, Rice University (2000 – 2005),
- Awarded Graduate Fellowship, Rice University (1999 – 2000)

Committees Served (needs to update)
- Computational Science Doctoral Program: Executive Committee Member (2013 – present),
- Organizer Sandia National Labs (SNL) – UTEP research collaboration meeting at SNL comprising about 10 faculty and 10 graduate students in next-generation computational investigations (Jan 14, 2016),
- Curriculum Committee member - Thermal-Fluid Course Curriculum (2011-2014),
- Scholarship committee member (2009),
- Faculty search committee member - Energy Track Faculty Hire (2009),
- Chair of the Shell Energy Security and Climate Change Seminar Series (Fall 2010),
- Founding member - (Shell) Energy Security and Climate Change Seminar Series (Fall 2010),
- Organizing committee member of the Southwest Energy Symposium (2012- 2013),
- Founding member of the Southwest Energy Symposium (2011),
- Organizing committee member - Satellite Sites for the VSCSE Summer School (2013),
- Scholarship committee member –Mechanical Engineering representative (2009),
- Solar Decathlon - Mechanical engineering representative (2011 – 2013),
- Computational Science Doctoral Program: Admission Committee (2010 – 2012),
- Computational Science Doctoral Program: Core Faculty (2008-present),
- Faculty Senate, Student conduct committee member for CoE (2011-12 & 2012-13),
- Faculty mentor, Science and Engineering Climate Change Organization Student Organization,
- Faculty mentor, Cricket Association (2009-10)

Membership in Professional Societies
- American Institute of Aeronautics and Astronautics (AIAA),
- American Society of Mechanical Engineer (ASME),
- American Society of Engineering Education (ASEE),
- Association of Computing Machinery (ACM),
- AIAA-Airdrop Decelerator System Technical Committee (TC) (2009-Present),
- Editorial Board on Journal of Energy Science and Technology, Organizing committee – FEMTEC 2009,
- AIAA-ADS Student Paper Competition Review Committee (2012 & 2013),
- AAAS Fellow's Carbon Capture & Storage Panel Member (Principal Deputy Assistant Secretary Victor Der, Professor Brian McPherson, and Professor Vinod Kumar) (April 2010)

Other Professional Activities and Public Service
- Journal/Conference Peer Reviewer *(needs to update)*

International Journal for Service Learning in Engineering, Humanitarian Engineering and Social Entrepreneurship (IJSLE)(2015), ASME FEDSM, ASME – HT/ESFuelCell, ASME Journal of Solar Energy Engineering, AIAA Journal of Aircraft, AIAA Airdrop Decelerator System Conference, American Institute of Physics Journal of Renewable and Solar Energy, Elsevier Journal of Solar Energy, International Journal of Thermal Sciences, ICCS2008, Metallurgical and Materials Transactions, OMAE2009, Int. Journal of Computational Fluid Dynamics

- Proposal Peer Reviewer *(needs to update)*
  - DOE Early Career Research Program, 2021
  - DOE/ASCR MMICS (2020)
  - DOE/ASCR MMICS (2019)
  - ConTex (2017),
  - NSF - DHR/Informal learning (2017),
  - Fulbright scholarship – Mechanical Engineering Domain Expertise (2015),
  - IITK - Faculty Initiation Grant (2015),
  - NASA Innovative Advanced Concepts (NIAC) (2011),
  - DOE –Multiphase flow/model validation merit reviewer (invited) (2011),
  - DOE Office of Science Graduate Fellowship Program (2012),
  - NIH -- Challenge Grant Ad-hoc reviewer (2009)

- Talks (needs to update)
    - Texas A&M, College Station – Invited Seminar Speaker (2011),
    - Shell Oil Company, Houston – Invited Seminar Speaker (2011),
    - Indian Institute of Technology, Patna – Invited Seminar Speaker (2011),
    - Int. Mech. Engg. Congress Impulso, Monterrey Tech – Keynote Speaker (2010),
    - Oklahoma State University, Stillwater - Invited Seminar Speaker (2010, 2017),
    - Indian Institute of Technology, Kanpur – Invited Seminar Speaker (2008),
    - American Association for the Advancement of Science (AAAS), Washington, DC - Invited guest speaker on the state-of-art of CCS technologies (2010)