



Kiran Bhaganagar, PhD

PROFESSOR OF MECHANICAL ENGINEERING

Director, Center for Advanced Measurements in Extreme Event (NASA MIRO Center at UTSA)
BSB 2.03.02

Laboratory of Turbulence,
Sensing and Intelligence Systems
EB 3.04.68

The University of Texas at San Antonio (UTSA)

Associate Fellow, American Institute of Aeronautics and Astronautics (AIAA)

American Physics Society Women Physicist Award (2017)

Editor Physics of Fluids, Special Issue, 2017

National Academy of Sciences, Engineering, Medicine (Reviewer BOEM,2019)

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EDUCATION

Postdoc	The University of California, Los Angeles, California (UCLA) Mechanical Engineering, Atmospheric Sciences Advisors: Dr. John Kim (2001-2003) and Dr. Bjorn Stevens (2003-2004)	2001-2004
PhD	Cornell University, Ithaca, New York Mechanical Engineering Advisor: Dr. John Lumley	2001
BS	College of Engineering, Osmania University, Hyderabad, Andhra Pradesh, India Mechanical Engineering	1994

APPOINTMENTS

Professor	The University of Texas at San Antonio Mechanical Engineering	2021-Present
Director (Principal Investigator)	NASA Miro Center for Advanced Measurements in Extreme Events at UTSA (CAMEE)	2021- Present
Core Faculty	NASA Miro Center for Advanced Measurements in Extreme Events at UTSA (CAMEE)	2019-2021
Associate Professor	The University of Texas at San Antonio Mechanical Engineering	2015-2021
Assistant Professor	University of Texas San Antonio, Tx Mechanical Engineering	2009-2015
Assistant Research Scientist	University of Michigan, Ann Arbor, MI Atmospherics, Oceanic and Space Sciences (AOSS)	2008-2009
Assistant Professor	University of Maine, Orono, Maine Mechanical Engineering	2004-2008

AWARDS & HONORS

American Institute of Aeronautics and Astronautics (AIAA), Associate Fellow	2019
American Physics Society Women Physicist Award,	2017
Invited Visiting Professor, Laboratoire des Écoulements Géophysiques et Industriel, LEGI, Grenoble, France, Aug-Dec 2017	2017
National Academies of Sciences, Engineering, and Medicine 2019. Review of the Bureau of Ocean Energy Management	2019
Editor, Physics of Fluids, Special Issue - A tribute to the lasting legacy of John Lumley in turbulence	2017

INTELLECTUAL PROPERTY

Invention Disclosure 2018.002.UTSA <i>Mobile- RTEC: Low cost mobile environmental sensing system with remote access in real-time</i> Inventor: Kiran Bhaganagar, Prasanna Kolar, Sudheer Bhimireddy and Jordan Nielson	2018
Invention Disclosure <i>Experimental facility for generation, measurement and visual detection of vertical momentum and buoyancy driven plumes</i> Inventor: Kiran Bhaganagar, Sudheer Bhimireddy, Prasanna Kolar, Victor Canseso, Danial Brun	2018
Invention Disclosure 2022.017.UTSA Integrated Mobile Platform for Maritime Target Detection and Tracking in Real-Time Inventor: K. Bhaganagar, <u>A. Alaeddini</u> , Prasanna Kolar	2021

PUBLICATIONS

*(Corresponding Author: *, Student or Mentee: M)*

Kiran Bhaganagar*, Chang Chen^M, Energetics of Buoyancy Generated Turbulent flows with active scalar: Pure Buoyant Plume, Journal of Fluid Mechanics (Accepted), 2022

Kiran Bhaganagar*, Sudheer BhimiReddy^M, Thanh Tran^M, Development of WRF-Buoyant Plume-LES (bplume-LES solver) with python post processing tool, Geophysical Model Development (in review), 2022

Kiran Bhaganagar*, Chang Chen^M, Inverse Turbulent Energy Cascade in Convective Buoyant plumes, Nature Physics, (In review), 2022

Jesse Slaten^M, Kiran Bhaganagar*, Ralph Kahn, Large Eddy Simulation of Wildland Fire Plume under idealized convective conditions, International Journal of Wildland Fires (in review), 2022

Thanh Tran^M, Kiran Bhaganagar*, Michael Garay, Olga Kalahnikova, Aerosol Plume Height Retrieval Stereoscopic Imaging method for FIREX-AQ AirMSPI Data, IEEE Transactions of Remote Sensing (in review), 2022

K. Bhaganagar*, P. Kolar, S.H.A. Faruqui^M, D. Bhattacharjee^M, A. Alaeddini, K. Subbarao, A Novel Machine-Learning Framework with a Moving Platform for Maritime Drift Calculations, *Frontiers in Marine Science*, 2022
Impact Factor 4.912 / CiteScore 5.0 , #1 Ranked journal in Marine Sciences

Chang Chen^M and Kiran Bhaganagar*, New Findings in Vorticity Dynamics of Turbulent Buoyant Plumes, Physics of Fluids, 2021

Tyrell Lewis^M and Kiran Bhaganagar*, Configurable simulation strategies for testing pollutant plume source localization algorithms using autonomous multi-sensor mobile robots, *International Journal of Advanced Robotic Systems*, 19(2), 2022

Thanh Tran^M and Kiran Bhaganagar*, the four stage development of starting Buoyant plumes, *Proceedings of the ASME 2021, Fluid Engineering division Summer Meeting, FEDSM2021-65540*, August 10-12 2021.

Victor Martinez^M and Kiran Bhaganagar*, Computational Fluid Dynamic analysis of the flow around a propeller blade of multicopter unmanned aerodynamic vehicle, *Proceedings of the ASME 2021, Fluid Engineering division Summer Meeting, FEDSM2021-65771*, August 10-12, 2021

Sudheer Bhimireddy^M, KiranBhaganagar*, Implementing a new formulation in WRF-LES for Buoyant Plume Simulations: bPlume-WRF-LES model, *Monthly Weather Review*, 149(7):2200-2310: 2021. *Journal Impact Factor: 5.0*

R. Meka^M, A. Alaeddini*, K. Bhaganagar, A Robust Deep Learning Framework for Short- Term Wind Power Forecast of a Full-Scale Wind Farm using Atmospheric Variables, *Energy*, 221 (2021), 119759

Tyrell Lewis^M and Kiran Bhaganagar*, A Comprehensive Review of Plume Source Localization Efforts Using Unmanned Vehicles for Environmental Sensing Information Fusion, *Science of the total Environment*, Vol 762, 2021 *Impact Factor: 8.0*

Diganta Bhattacharjee^M, Kamesh Subbarao and Kiran Bhaganagar*, Reachable Set Estimation for Discrete-Time Nonlinear Systems Using Ellipsoidal Set-Membership Frameworks, *AIAA Scitech 2021 Forum. AIAA 2021-1459*. January 2021

Bhaganagar K*. A physics-based mathematical model to understand the aerosol transmission risk of COVID-19. *J Med Sci Res.* 2020; 8(S1):3-5.

Kiran Bhaganagar* & Sudheer BhimiReddy^M, Local Atmospheric Factors that enhance Air-borne Dispersion of Coronavirus - High-fidelity Numerical Simulation of COVID19 case study in Real-Time, *Environmental Research*, Vol 191, 110170, 2020.

Journal Cite Score: 8.4, Impact Factor: 5.71

Kiran Bhaganagar* and Sudheer BhimiReddy^M, [Numerical Investigation of starting turbulent buoyant plumes released in Neutral atmosphere](#). *Journal of Fluid Mechanics*, V900, A32, 2020.
#1 Ranked Journal in Fluid Mechanics. Journal Impact factor: 4.71

Jordan Nielson^M, Kiran Bhaganagar,* Rajitha Meka^M, A. Alaeddini, [Using atmospheric inputs for Artificial Neural Networks to improve wind turbine power prediction](#), *Energy*,190:117263, 2020

Journal Cite Score: 9.9, Journal Impact factor: 6.08

Jordan Nielson* and Kiran Bhaganagar, [Using field data-based large eddy simulation to understand role of atmospheric stability on energy production of wind turbines](#), 43(6):625-638, *Wind Engineering* (2019)

Diganta Bhattacharjee^M, Kamesh SubbaRao and Kiran Bhaganagar, [Nonlinear Model Predictive Control based Cooperative Plume Tracking using Unmanned Aerial Vehicles](#), *AIAA Science and Technology Forum and Exposition* 2019

Sudheer, R. Bhimireddy^M & Kiran Bhaganagar*, Performance [Assessment of Dynamic Downscaling of WRF to Simulate Convective Conditions during Sagebrush Phase I Tracer Experiments](#), *Atmosphere*, 2018

Journal Impact Factor: 2.4

Jordan Nielson^M & Kiran Bhaganagar*, [Capturing Day to Day Diurnal Variations of Stability in the Convective Atmospheric Boundary Layer Using Large Eddy Simulation](#), *The open Atmospheric Science Journal* 2018

Sudheer R. Bhimireddy^M & Kiran Bhaganagar*, [Short-term passive tracer plume dispersion in convective boundary layer using a high-resolution WRF-ARW model](#), *Atmospheric Pollution Research*, 9:901-911, 2018

Journal Cite Score: 5.2, Impact Factor: 3.5

Kiran Bhaganagar* & Narasimha Rao Pillalamarri,^M [Lock-Exchange Release density currents over 3-D regular roughness elements](#), *Journal of Fluid Mechanics*, 2017

Manjura Nayamatullah^M, Narasimha Rao Pillalamarri^M & Kiran Bhaganagar*, [Large-Eddy-Simulation Approach in Understanding flow structures of 2-D Turbulent Density Currents over sloping surfaces](#), *Fluid Dynamics Research*, 2017

Kiran Bhaganagar* & Sudheer BhimiReddy^M, [Assessment of the plume dispersion due to chemical attack on April 4, 2017, in Syria](#), *Natural Hazards*, 2017

Journal Impact Factor: 2.4; Press Coverage of the publication

Kiran Bhaganagar, [Role of head of turbulence 3-D density currents in mixing during slumping regime](#), *Physics of Fluids*, 020703, 2017

#3 Ranked Journal in Fluid Mechanics Journal Impact Factor: 3.385

Kiran Bhaganagar, Tom Gatski and Will George, [Preface to special-topic: A tribute to John Lumley](#), *Physics of Fluids*, 020501, 2017

Journal Impact Factor: 3.385

Kiran Bhaganagar et al, Editorial: [Tributes to the lasting legacy of John Leask Lumley in turbulence](#): A perfect man in an imperfect world, *Physics of Fluids*, 020601, 2017

Kiran Bhaganagar* and Mithu Debnath^M, [Effect of Mean Atmospheric Forcings of Stable Atmospheric Boundary Layer on Wind Turbine Wake](#), *Journal of Renewable and Sustainable Energy*. 2015. *Journal Impact Factor: 1.6*

Kiran Bhaganagar* and Long Chau^M, [Characterizing turbulent flow over 3-D idealized and irregular rough surfaces at low Reynolds number](#), *Applied Mathematical Modeling*, 2014.

Kiran Bhaganagar, [Direct numerical simulation of lock-exchange density currents over rough wall in slumping phase](#), *Journal of Hydraulic Research*, 2014. *Journal Impact Factor: 2.1*

Kiran Bhaganagar* and Carlos Moreno^M, Modeling of Stenotic coronary artery and implications of plaque morphology on blood flow, *Modelling and Simulation in Engineering*, Volume 37, Issue 7, Pages 5381–5393, 2013

Kiran Bhaganagar*, Chetan Veeramachaneni^M, Carlos Moreno, Significance of plaque morphology in modifying flow characteristics in a diseased coronary artery: Numerical simulation using plaque measurements from intravascular ultrasound imaging, *Applied Mathematical Modeling*, 37(7):5381-5393, 2013

Kiran Bhaganagar* and Richard Leighton, Three level decomposition for the analysis of turbulent flow over rough-walls, *Journal of Applied Fluid Mechanics*, 6(2):257-265,2012

Long Chau^M and Kiran Bhaganagar*, Understanding turbulent flow over ripple-shaped random roughness in a channel, *Physics of Fluids* 24, 115102, 2012

Kiran Bhaganagar* and Vejapong Juttijudata, Turbulent time-events in channel with rough walls, *Theoretical and Computational Fluid Dynamics*, December 2012, Volume 26, Issue 6, pp 583–589, 26(6): 583-589, 2012

K. Bhaganagar*, R. Beaumont^M, B. Segee and B. Ozer, Using fuzzy logic for Morphological Classification of IVUS-based plaques in Coronary artery in the context of hydrodynamics, *Soft Computing*, 14: 265, 2010.

K. Bhaganagar* Direct numerical simulation of flow in stenotic channel to understand the effect of stenotic morphology on turbulence, *Journal of Turbulence*, N41, Volume 10, 2009

K. Bhaganagar* and T. Hsu, Direct Numerical simulations of flow over two-dimensional and three-dimensional ripples and implication to sediment transport: Steady flow, *Coastal Engineering*, Volume 56, Issue 3, March 2009, Pages 320–331

K. Bhaganagar*, Direct numerical simulation of unsteady flow in channel with rough walls, *Physics of Fluids* 20, 101508 (2008)

M. Sen^M, K. Bhaganagar* and V. Juttijudata, Application of proper orthogonal decomposition (POD) to investigate a turbulent boundary layer in a channel with rough walls, *Journal of Turbulence*, Article: N41: Vol 8, 2007

K. Bhaganagar*, J. Kim and G. Coleman, "Effect of roughness on pressure fluctuations in a turbulent boundary layer", *Physics of Fluids*, 028103, 2007

K. Bhaganagar*, J. Kim and G. Coleman, Effect of Roughness on wall bounded turbulence, *Flow, Turbulence and Combustion*, July 2004, Volume 72, Issue 2, pp 463–492,2004

K. Bhaganagar*, D. Rempfer and J.L. Lumley, Direct Numerical Simulation of Spatial Transition to Turbulence using Fourth-Order Vertical Velocity Second-Order Vertical Vorticity Formulation, *Journal of Computational Fluid Dynamics*, Volume 180, Issue 1, 20 July 2002, Pages 200-228, 2002

BOOKS

Kiran Bhaganagar, Fundamental of Turbulence, Wiley Publications, (in preparation), 2023

Armistead Russell, Kiran Bhaganagar, Bart Croes, Joost De Gouw, Robert Yamartino, Qi Yang, *National Academies of Sciences, Engineering, and Medicine 2019*. Review of the Bureau of Ocean Energy Management "Air Quality Modeling in the Gulf of Mexico Region" Study. Washington, DC: The National Academies Press. <https://doi.org/10.17226/25600>. Paperback ISBN: 978-0-309-49880-7

Editor, *Physics of Fluids*, Special Issue - A tribute to the lasting legacy of John Lumley in turbulence, February 2017.

PRESENTATIONS

- Jesse Slaten, Kiran Bhaganagar, Entrainment and Mixing in a Convective Boundary Layer Using WRF-bPlume, 102nd, American Meteorological Society, Annual Meeting, Houston, Texas, Jan 23-27,2022
- Ishan Bhattarai and Kiran Bhaganagar, Effect of Roughness on Entrainment of Turbulent Buoyant Flows, 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, Arizona, November, 2021
- Chang Chen and Kiran Bhaganagar, Vortical Structures in Turbulent Buoyant Plumes, 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, Arizona, November, 2021
- Pratik Mitra and Kiran Bhaganagar, Direct Numerical simulations of rough wall-bounded turbulence over unsteady channel flows, 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, Arizona, November, 2021
- Jesse Slaten and Kiran Bhaganagar, Turbulent Entrainment in Buoyancy Driven Flows in a stratified environment using WRF-LES. 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, Arizona, November, 2021
- Daniel Brun and Kiran Bhaganagar, Flow calculations of Forces Buoyant Plumes using infra-red Gas visualization. 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, Arizona, November, 2021
- Thanh Tran and Kiran Bhaganagar, Video: Starting Turbulent Plumes – Formation and Growth. 74th Annual Meeting of the APS Division of Fluid Dynamics, Phoenix, Arizona, November, 2021
- Meka, R. K. Bhaganagar & A. Alaeddini. (2020). A Deep Learning Framework for Forecasting Power in a Full-Scale Wind Farm, 100th, American Meteorological Society Annual Meeting, Boston, MA, January 16th-19th,2020.
- S. BhimiReddy, K. Bhaganagar (2020). New Implementation of Buoyant Transport and Dispersion in Weather Research & Forecast's Large-Eddy Simulation Framework, 100th, American Meteorological Society Annual Meeting, Boston, MA, January 16th-19th,2020.
- D. Brun, S. BhimiReddy and K. Bhaganagar, Plume Chamber studies to characterize Turbulent Buoyant Plumes using multiple sensors, Bulletin of the American Physical Society, APS-DFD, Seattle, 2019
- S. BhimiReddy and K. Bhaganagar, Bulletin of the American Physical Society, APS-DFD, Seattle, 2019
- Nielson, J. & Bhaganagar, K. (2018). Using Artificial Neural Networks and the Rapid Refresh Model for Wind Energy Forecasting, 71st Annual Meeting of the APS Division of Fluid Dynamics, November 18–20, 2018; Atlanta, Georgia
- Brun, D. Bhimireddy, S. & Bhaganagar, K. (2018). Flow Calculations of Forced Buoyant Plume using Infrared Gas-Visualization, 71st Annual Meeting of the APS Division of Fluid Dynamics, November 18–20, 2018; Atlanta, Georgia
- Bhimireddy, S., Brun, D. & Bhaganagar, K. (2018). Investigation of mean scalar characteristics of vertical buoyant gas plume inside a gas chamber with multiple sensors, 71st Annual Meeting of the APS Division of Fluid Dynamics, November 18–20, 2018; Atlanta, Georgia
- Bhaganagar, K., & Reddy, S. (2016). Simulation of plume rise: Study the effect of stably stratified turbulence layer on the rise of a buoyant plume from a continuous source by observing the plume centroid (20th ed., vol. 61). 69th Annual Meeting of the APS division of Fluid Dynamics, Portland, Oregon, November 2016.
- Bhaganagar, K., & Nielson, J. (2016). Using Reconstructed POD Modes as Turbulent Inflow for LES Wind Turbine Simulations (20th ed., vol. 61). 69th Annual Meeting of the APS division of Fluid Dynamics, Portland, Oregon, November 2016.
- J. Nielson and K. Bhaganagar, Towards LES Modeling of the Diurnal Cycle from Field Data Inputs, WindFarms-2016,,Dallas, April, 2016
- J. Nielson and K. Bhaganagar, Using LES to Understand Wake Evolution During Diurnal Cycle, 9-15-1 15th International Symposium on Measurement and Modeling of Environmental Flows, International Mechanical Engineering Congress and Exposition, November 13-19, 2015, Houston, Texas.
- K. Bhaganagar, M. Naymatullah, C. Cenedese, AGU Annual Meeting, San Francisco, 2014.
- K. Bhaganagar and F. Hussain, Vortex structures in wind turbine wake due to atmospheric stratification, 67th APS-DFD, San Francisco, 2014.
- K. Bhaganagar, Jordan Nielson and Mithu Debnath, Turbulence in wind turbine wake: Effect of atmospheric forcings, ASME Congress of Mechanical Engineering and exposition, Montreal, 2014.
- K. Bhaganagar, J. Nielson* and M. Debnath*, Turbulence in wind turbine wake, Effect of atmospheric

- forcings, , November 14-20, Fluid Dynamics meeting, Canyon Lake Texas, 2013
- K. Bhaganagar and R. Chowdhury, Buoyancy driven turbulent flows over irregular rough surfaces, 65th Annual Meeting of the APS Division of Fluid Dynamics November 18-20, 2012; San Diego, California
 - C. Moreno and K. Bhaganagar, Patient specific flow dynamic simulations of flow in diseased coronary artery, 65th Annual Meeting of the APS Division of Fluid Dynamics November 18-20, 2012; San Diego, California
 - G. Sloan, Z. Feng, K. Bhaganagar and D. Benerjee, Numerical simulation of nanoparticle simulation with experimental validation, 65th Annual Meeting of the APS Division of Fluid Dynamics November 18-20, 2012; San Diego, California
 - K. Bhaganagar, Buoyancy driven flows and application to environmental flows, Collaborative Initiative for Wind Turbine Research, Lubbock, Texas, March 2012
 - K. Bhaganagar, Direct numerical simulations of density currents over rough surfaces, APS-DFD, Baltimore, MD, 2011
 - L. Chau and K. Bhaganagar, Direct numerical simulations of flow over ridges in the presence of waves and current, 63rd APS-DFD, Long Beach, CA, 2010
 - K. Bhaganagar, R. Leighton, An Analytical framework for the study of rough-wall turbulent boundary layer, 63rd APS-DFD, Long Beach, CA, 2010
 - R. Leighton and K. Bhaganagar, Turbulence production by rough boundaries, 2010, State College, PA, June, 2010
 - K. Bhaganagar, V. Juttijudata, M. Sen, Further insight into physics of rough-wall turbulent boundary layer” 61st APS-DFD, Washington, D.C., 2008

INVITED TALKS

- Buoyant Turbulent Plumes: UTSA Wildland fire WRF-LES bplume model, UTSA WRF-LES-bplume model for WildFires” at the USFS NOAA Fire Weather Research MOU WG Meeting on Dec 9 2021
- “Extreme Computing and Extreme Events in the Environment” at the IXPUG Annual Conference 2021, Oct 19-21, 2021, Keynote, <https://www.ixpug.org/ixpug-2021>
- Overview of NASA CAMEE Research and the Artemis Mission, 2nd Annual Conference of Center for Advanced Measurements in Extreme Events, San Antonio, TX, August 2021
- Novel Sensing and machine learning for drift prediction of objects in the ocean subject to wind and wave forcings, UTSA Distinguished Lecture, November 2020.
- Implementation of buoyancy forcings using WRF-LES for Wildland Fire plumes, TACC Symposium, October, 2020
- Grand Vision for Wind Energy, NAWEA WindTech Amherst, MA, 2019, Machine Learning Approach towards short term forecasting of wind turbine power production.
- University di Roma tre, Rome, Italy, November 2017, Entrainment and mixing in ocean and role of lock-exchange release turbulent flows.
- University of Lorraine, Nancy, France, October 2017, Framework of density currents over roughness
- Barcelona Supercomputing Center, Barcelona, Spain, October 2017, Understanding turbulence mixing in oceanic and atmospheric flows from Simulations to UAV's
- Laboratoire des Écoulements Géophysiques (LEGI), Grenoble. France, October 2017, Understanding role of roughness effects on turbulence mixing in Turbulence buoyancy driven flows
- European Turbulence Conference (ETC16), Stockholm, Sweden, August 2017, Density currents over rough-walls: Relation between drag and mixing.
- European Geophysical Unit, Vienna, April 2017, Few thoughts on Mixing and Entrainment of Lock-Release Turbulent Dense Currents over Rough-Surfaces
- 11th International ERCOFTAC Symposium on Engineering Turbulence Modeling and Measurements, Palermo, Sicily, Italy, September 2016, Framework for Buoyancy-Driven Flows using Large Eddy Simulations.
- EGU, Vienna, April 2016, Numerical investigation of entrainment of dense currents
- Whither turbulence and big data, Cargese Institute, Corsica, April 2015, Effect of roughness on turbulence from lab-scales to atmospheric scales.
- Work Shop on Challenges in Wind Energy: Future directions & Role of Wake Effects, August 9th, Pollachi, Coimbatore, India, 2015

- Towards improved prediction of wakes of wind turbines, International Conference on Renewable Energy and Sustainable Environment, August 10-13, Pollachi, Coimbatore, India, 2015
- Towards improved prediction of wake-wake interactions of wind turbine, Iowa State University, Ames, Iowa, 04/22/2014
- Understanding density currents over rough-topography, Symposium on Fluid Dynamics, San Juan Puerto Rico, November 2013.

RECENT FUNDING ACTIVITIES

TOTAL FUNDING: 8 MILLION DOLLARS

1. (Role: PI): Renewal NASA MIRO Center for Advanced Measurements in Extreme Environments, Amount: Performance period: Oct 1st, 2022- Oct 1st, 2024, Amount: **2 million dollars**
2. (Role: Co-I): A Novel Semi-Supervised Kernel Formulation for Extrapolation from Small Datasets: Rapid Predictive Modeling of the Effect of a Leeway Object Geometry on its Drift and Divergence in Deep Waters, Amount: **\$350K** (Bhaganagar contribution, 40%)
3. (Role: PI), NASA, MUREP INCLUDES, City-based Integrated Engineering Training Alliance to Engage, Educate and Empower the Next Generation STEM Workforce, Performance period: Aug-Dec 2020, Budget: **\$50,000**
4. (Role, PI), **Sub Award modification**, Developing a Data Driven Technology towards Improved Leeway Divergence Prediction.” under the provisions of the MSRDC Cooperative Agreement #W911SR-14-2-0001. Awarded September 23rd, 2020, **Budget: \$90,000**
5. (Role: PI), Department of Homeland Security (United States Coastal Guard) through MSRDC, Developing a Data-Driven Technology towards Improved Leeway Divergence Performance period: January 1st, 2020-May 1st, 2021, **Budget: \$289,379:**
6. (Role: Co-PI), Supercritical Carbon Dioxide (sCO₂) Power Generation for Renewable Energy Extraction; *PI: Christopher Combs, Performance period: Oct 2019-Oct 2022. Amount: \$400,000 (Bhaganagar contribution: 17%)*
7. (Role: PI): NASA MIRO Center for Advanced Measurements in Extreme Environments, Amount: Performance period: Oct 1st, 2019- Oct 1st, 2022, Amount: **3 million dollars**
8. (Role: PI): Department of Homeland Security (US Army Edgewood Chemical and Biological Division) through MSRDC, Novel Technology for detection and prediction of spreading of air-borne chemical agent, Performance Period: Oct 2019- Feb 2020, Amount: **\$90,300**
9. (Role: PI): UTSA Urban Institute, Urban Air Quality Detection using In-Situ sensors and prediction model, Performance Period: August 2019-August 2020. Amount: **\$10,000.**
10. (Role: PI): Department of Homeland Security (US Army Edgewood Chemical and Biological Division) through MSRDC, Novel Technology for detection and prediction of spreading of air-borne chemical agent, Performance Period: Oct 2015- Oct 2017, Amount: **\$258,515**
11. (Role: PI): **NSF**, Entrainment in dense currents over rough bottom, July 2013-July 2016, OCE-1333033, PI Kiran Bhaganagar \$250,000
12. (Role: PI): UTSA VPR, “Developing wind turbine technology for efficient aerodynamic performance”, PI Kiran Bhaganagar, Co-PI Rolando Vega, Performance Perion: (2014-2015), Amount, **\$45,000**
13. (Role: PI): **NSF**, EAGER: Understanding fundamental mechanisms involved in the turbulence, current and wave interactions for offshore wind-turbines, CBET-Energy for Sustainability 1348480, PI Kiran Bhaganagar **\$40,000**
14. (Role: PI): NSF, Effect of stratification on the wake interactions of wind turbine array over a rough-terrain, HRD-1242180, PI Kiran Bhaganagar, Co-PI Luciano Castillo (TTU) **\$100,000**

15. (Role: PI) UTSA-collaborative research seed grant, A framework for coastal flows using large scale numerical simulations, PI Kiran Bhaganagar (UTSA), Co-PI Basu (SWRI) 2010-2011, **\$30,000**
16. (Role:PI) Teragrid computing 500K SU's/year (super-computing units), 2010-2021 (*renewed yearly*)
17. (Role Collaborator) CPS Energy (\$500K, Bhaganagar: \$45K) “Intelligent Energy Systems Research Program”, Rolando Vega, Hongjie Xie, Walter Richardson, Hariharan Krishnaswami, Bing Dong, Daniel Pack, Nikolaos Gatsis, Kiran Bhaganagar, Mohammad Jamshidi, **\$45,000**

SYNERGISTIC ACTIVITIES

- **K-12 Teachers Workshop** (August 5-6, 2020, June 6-7, 2021, Jun 9th-10th, 2022): Organizer for K-12 teacher’s workshop on “Visualization of Wildland Fires” funded by NASA. Material was disseminated to the teachers on (a) history of wildland fires, (b) Fluid Dynamics of fire and smoke plumes, (c) Turbulence and buoyancy concepts. Elementary, middle-school, and high-school teachers attended the conference. The feedback was extremely favorable.
- **Community College Internship Program** (Summer, 2020, 2021, 2022): Organizer for community college internship program funded by NASA. My role included (a) Selecting the applicants in the Alamo college to participate in the internship program, (b) Matching the UTSA faculty mentors to the student participants, (c) mentoring the students to participate in the Summer conference event.
- **K-12 Stakeholders town hall meeting** (October 2020): As a PI to the funded NASA INCLUDES planning grant, I am actively involved in forming an alliance of K-12 stakeholders to find strategies to transition K-12 students to STEM careers.
- **Interdisciplinary townhall meeting for NSF NRT Grant** (November 2018): Organizer of townhall meeting with researchers in the areas of data sciences, geosciences, unmanned systems and education to understand the challenges in interdisciplinary curriculum.
- **Interdisciplinary Graduate student Seminar Series** (October 2019-) Organizer for interdisciplinary monthly seminar series to graduate students. The theme of these seminar series is to introduce to the student the multi-faceted aspects of extreme events.
- **CAMEE Spring Showcase Event** (March 2020, 2021, 2022), Organizer for CAMEE student spring showcase event
- Instructor for Climate Change Course for Senior Citizens (. January 2020, August 2021) : Topic area Wildland Fires in California
- Technical committee of National Academy of Science, NAS Board on Atmospheric Science and Climate, 2017-2019

- Organizer Aviation conference, AIAA 2018, 2019
- Editorial Role: Editor, Special Issue, Physics of Fluids (March, 2017), Tribute to Legacy of John Lumley
- Associate Editor: Atmospheric Science Letters, Progress in Computational Fluid Dynamics, Journal of Flow Visualization and Imaging.
- Workshop Organizer: Texas, Annual Fluid Dynamics (2013,2014,),
- Administrative role: Director CAMEE (2021-), Chair, Graduate Student Committee (2013-2017), Committee member for F&A of Mechanical Engineering (2012-2017), Graduate Committee (2010-2017), Undergraduate Committee (2010-2012), Faculty development, Mentor for underrepresented women and minority in education in Women's resource center (2010-2017)
- Federal Agency Proposal Reviewer: Reviewer and Panel member for NSF TUES proposals (2011), NSF SBIR (02/2014), NSF GRF (02/2014, 2015, 2016), NSF CBET(04/2014, 2015, 2016), Reviewer for Nuclear Energy University Programs Proposals (03/2010, 03/2011)

GRADUATE AND UNDERGRADUATE MENTORING ACTIVITIES

UNDERGRADUATE STUDENT MENTORING

August 2021-January 2022: Mentoring Undergraduate Honors student (Team of 15 student) for NASA Big Idea, Challenge, "*Exploring the Inner Lava tubes: H.E.R.M.I.T. the Capable Crustacean Creation*" for consideration in NASA's 2022 **BIG Idea** Challenge (Lead: Joshua Le)

October 2020-September 2021: Mentoring CAMEE undergraduate students for the MARS Rover Design Challenge (team lead: Zach Riddle) funded by NASA CAMEE

May 2021-August 2021: Mentoring 4 students from Alamo Community colleges funded by NASA CAMEE

December 2019- May 2020: Mentoring ME Senior Design team for NASA MINDS Competition (team lead: Samatha Pickell): Received an award of \$5000 from NASA MINDS program

Dec 2020- May 2021: Mentoring ME Senior Design team (Low-speed Wind tunnel design) funded by Dept. of ME. (team lead: Kevin Posladek)

December 2019- October 2020: Leeway drift prediction experiments funded by Dept. Homeland Security (Joshua Le, Zach Riddle, Sam Pickell)

June 2017-May 2019: Plume Chamber measurements funding by Army Research Lab (Victor Canseco, Daniel Brun)

Others: Flow visualization and Coding: Ganza Prince (2014-2015), Tyler Guglielmo (2012-2015), Preston Roberts (2013-2013), Eric Ruiz (Oct 2011-2012), Ryan Brabant (Dec 2011-Dec 2012), Matthew Taliaferro (Jan 2010-June 2010)

GRADUATE STUDENTS MENTORING

- Akhyay Ravi, Ph.D. (2021-), Thesis topic, DNS of unsteady flow over complex geometry
- Ishan Bhattarai, MS (2020-2022), Thesis topic, *Density current over roughness*
- Jesse Slatten, Ph.D. (2019-), Thesis topic, *Turbulent Buoyant Plumes.*
- Pratik Mitra, MS (2020-2022), Thesis topic, *Rough wall turbulent flows*
- Samuel Guerra, MS (2019-), Thesis topic, *Vortex identification in Plumes*
- Thanh Tran, MS (2019-2022), Thesis topic, *Open big-data platform for Turbulent Atmospheric Plumes*
- Anthony Belzung, MS. (2018-), Thesis topic, *CFD of supercritical Co2*
- Daniel Brun, MS (2019- 2022), Thesis topic, *Mobile Sensing for Atmospheric boundary layer*
- Ryan Beckmann, MS (2019-2022), Thesis topic, *Aerodynamic/hydrodynamic drag quantification on leeway object.*
- Tyrell Lewis, MS (2019-2021), Thesis title: *Configurable Simulation Strategies for testing pollutant plume source localization algorithms using autonomous multisensory mobile robots*
- Sudheer Bhimireddy, Ph.D. (2015-2020), Thesis title, *A novel integrated framework to study buoyant turbulent plumes released into atmosphere.*
- Pavan Narasimha Pillalamarri, Ph.D. (2015-2018), Project title: Density currents over rough-surfaces
- Chris Bansah, M.S. (2016-2018): Special Project.
- Jordan Neilson, Ph.D. (2014-2018), Thesis title *Pitch and Yaw control of wind turbine for optimal performance in wind turbine array*
- Manjura Md., Ph.D. (2013- 2016), Thesis title, *Unified framework for density currents over rough sloping surfaces*
- Mohammad Sazzad (2014-2016), Thesis title, *Towards improved efficiency in wind farms*
- Matt Larcom, MS (2014-2015), Thesis title, *Towards improved prediction of power output of wind turbines in a wind farm due to wake effects.*
- Mithu Debnath, MS (2011-2014), Thesis title, *Influence of Atmospheric Boundary layer on turbulence in wind turbine wake*
- Chad Oian, MS (2012 – 2014), Thesis title *Numerical analysis of higher order wide angle split beam propagation method with applications to computational fluid dynamics simulation*, Co-Advisor (Dr. Robert Thomas, AFRL)
- Carlos Moreno, MS (2011-2013), Thesis title *Role of plaque morphology in altering the flow in diseased coronary artery*
- Raghiv Chowdhury, MS (2011-2012), Thesis title *Effect of roughness on density currents*
- Long Chau, MS (2010-2012), Thesis title *Role of irregular roughness on turbulent flow.*
- Chetan Veeramachaneni, MS (01/2010-05/2011), *Unsteady flow analysis of stenotic coronary artery*
- Gabriel Cruz, MS (2011-2013): Special project

CURRICULUM DEVELOPMENT AND TEACHING

Fluid Dynamics, Undergraduate level ME 3663 (Fall 2010, Spring 2019 – 2 sections, Spring 2018 – 2 sections, Fall 2016 – 2 sections, Spring 2018 – 1 section, Fall 2021), Fluid Dynamics,

Computational Fluid Dynamics, Graduate Level ME 5663 (Spring 2010, Fall 2015, Fall 2018),

Turbulence, Graduate Level, ME 5753 (Spring 2014, Fall 2019, Spring 2016) (Fluid Dynamics in Natural Systems

Advanced Computational Fluid Dynamics, Graduate Level, ME 6973. (Spring 2017, Fall 2020),

Numerical Methods, Undergraduate Level ME 2173 (Fall 2011, Spring 2011, Fall 2012, Spring 2012, Fall 2013, Spring 2013, Fall 2014, Spring 2014).

Advanced Fluid Mechanics, Graduate Level ME 5613 (Fall 2009)

Big Data in Python, Undergraduate/Graduate level (Spring 2021)

RESEARCH IMPACT AND PRESS COVERAGE

1. NASA CAMEE in SA Express News: Front page

<https://www.expressnews.com/business/article/UTSA-space-exploration-17054413.php>

2. *Societal Importance of the work from TV News Coverage:*

<https://www.ksat.com/news/local/2020/09/30/utsa-study-shows-airborne-coronavirus-particles-could-travel-more-than-a-mile/>

3. <https://www.technologynetworks.com/informatics/articles/using-supercomputers-to-predict-dispersal-of-chemicals-and-pollutants-311834>

4.. https://www.eurekalert.org/pub_releases/2018-08/uota-pfc082118.php

SERVICE ACTIVITIES

Departmental Committees

Chair of Graduate Student Committee (GSC) (2015-2017), F & A committee membership (2018-2020), Faculty Search Committee (2019)

College Committees:

CFRAC committee (2018, 2019), College awards committee (2016-2019), Space allocation committee (2019-)

University Committees:

Curriculum Committee (2016, 2017), Counselor of Faculty Senate (2019 (Spring),2020, 2021, 2022), University awards committee (2016-2019).

Scientific community:

Panel Member: NSF, Fluid Dynamics (2016, 2017, 2018), NSF TUES (educational) (2016-2018), GRF (educational) (2016-2019), EPSOR wind energy, NASA ROSES (2018, 2019), SBIR wind energy (2016, 2017, 2019), CBET turbulence panels (2014- 2019)

Journal Editor: Associate Editor for Atmospheric Science Letter, (2019 -) Progress in Computational Fluid Dynamics (2018 -), Journal of Flow Visualization and Imaging (2017 -), Special Issue for Physics of Fluids (2017)

National Level Committee and Activities: Technical Committee of Fluid Dynamics, AIAA, member (2016-), Technical Committee of National Academy of Science, NAS Board on Atmospheric Science and Climate (2019- 2020), Committee on Meteorological Aspects of Air Pollution (CMAAS) for American Meteorological society (2019 -), Committee on Boundary Layer and Turbulence for American Meteorological Society (2019 -) , American Physics Society, Division of Fluid Dynamics (APS-DFD) , External Affairs Committee, Chair (2021).