

Kursat Kara, Ph.D.

Assistant Professor, School of Mechanical & Aerospace Engineering, Oklahoma State University

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Citizenship: U.S. Citizen

Professional Preparation

2009 – 2010	Post. Doc.	Penn State University, PA	Aerospace Engineering
2003 – 2008	Ph.D.	Old Dominion University, VA	Aerospace Engineering
2000 – 2003	M.Sc.	Istanbul Technical University, Turkey	Aeronautical Engineering
1995 – 1999	B.Sc.	Istanbul Technical University, Turkey	Aeronautical Engineering

Appointments and Positions

2019 –	Assistant Professor, School of Mechanical and Aerospace Engineering, Oklahoma State University, Stillwater, OK, US.
2018 – 2019	Visiting Professor, Mechanical Engineering Department, University of Wyoming, Laramie, WY.
2010 – 2018	Assistant Professor, Aerospace Engineering Department, Khalifa University, Abu Dhabi, UAE.
2008 – 2009	Aerodynamics/CFD Engineer, New England Analytics LLC, Shelton, CT, US.

Grants

- \$649,879 (**62%**), NASA Early Stage Innovations (ESI22), Physics-Guided Multifidelity Learning for Characterization of Blunt-Body Dynamic Stability, 2023 – 2026, Award Number 80NSSC23K0231, Collaborator: O. San (University of Tennessee, Knoxville).
- \$1,490,043 (**20%**), NSF NRI: INT: Safe Wind-Aware Navigation for Collaborative Autonomous Aircraft in Low Altitude Airspace, 2020 – 2023. Award Number: 1925147, Collaborators: H. Bai, J. Jacob, R. Kamalapurkar, N. Fala, and S. Vance.
- \$29,963 (**100%**), NASA Oklahoma EPSCoR Research Initiation Grant 2022, Direct Numerical Simulation of Broadband Acoustic Metasurfaces to Stabilize Acoustic Modes in Hypersonic Boundary Layer, 2022 – 2023.
- 750,000 ACCESS Credits (**100%**), Discover ACCESS: MTH220018, Devising Scientific Machine Learning Based Methods for Safe Wind Aware Navigation of Small Unmanned Aerial Systems in Urban Spaces,
- \$45,000 (**33%**), OCAST AR20-020, Next Generation Smart Heatsinks, 2021 – 2022. Collaborators: H. Vora (OSU) and A. Alexander (OSU).
- \$15,994 (**50%**), Research Experience for Undergraduates (REU) supplement project to employ two Undergraduate RAs for the NSF project, “NRI: INT: Safe Wind-Aware Navigation for Collaborative Autonomous Aircraft in Low Altitude Airspace REU Supplement,” Award Number (FAIN): 1925147, Collaborator: H. Bai (OSU)
- \$2,796.82 (**100%**), XSEDE Allocation EES210020, Data-Driven Machine Learning for Safe Wind Aware Navigation of Small UAVs in Urban Spaces, <https://xras.xsede.org/public/requests/41777-XSEDE-EES210020>
- \$1,618.76 (**100%**), NASA Oklahoma Space Grant Consortium/NASA EPSCoR, Hypersonic Boundary-Layer Receptivity to Solid Particulates, 2019-2022.

Selected Publications (& Graduate Student and & Undergraduate Student supervised in Kara’s group)

- & Vuppala, R. K., Krawczyk, Z., Paul, R., and **Kara, K.** (2024). Modeling advanced air mobility aircraft in data-driven reduced-order realistic urban winds. *Scientific Reports*, 14(1), 383.
- & Oz, F., & Goebel, T. E., Jewell, J. S., and **Kara, K.** (2023). Local wall cooling effects on hypersonic boundary-layer stability. *Journal of Spacecraft and Rockets*, 60(2), 412-426.
- & Oz, F., San, O., and **Kara, K.** (2023). An efficient quantum partial differential equation solver with Chebyshev points. *Scientific Reports*, 13(1), 7767.

- &Vuppala, R., Revard, B., Jacob, J., and **Kara, K.** (2023). Wind Field Prediction in Urban Spaces using Machine Learning based Reduced Order Models for Unmanned Aerial Systems. *103rd AMS Annual Meeting*. AMS.
- &&Landua, T. R., &Vuppala, R. K. S. S., and **Kara, K.** (2022). Investigation of Airflow around Buildings using Large Eddy Simulations for Unmanned Air Systems Applications. *AIAA SciTech Forum 2022*. (p. 1688).
- &Vuppala, R. K., and **Kara, K.** (2022). A non-intrusive reduced order model using deep learning for realistic wind data generation for small unmanned aerial systems in urban spaces. *AIP Advances*, 12(8).
- &Oz, F., &Vuppala, R. K., **Kara, K.**, and Gaitan, F. (2022). Solving Burgers' equation with quantum computing. *Quantum Information Processing*, 21, 1-13.
- &&Richmond, I., &Alam, M., and **Kara, K.** (2022). Numerical Simulation of an Atmospheric Entry Vehicle at Subsonic Speeds for Dynamic Stability. *Bulletin of the American Physical Society*.
- &&Nguyen, T., &Oz, F., and **Kara, K.** (2022). Dynamic Stability of the Mars Science Laboratory Entry Vehicle in Supersonic Flow. *Bulletin of the American Physical Society*.
- &Alam, M., and **Kara, K.** (2022). The influence of exit nozzle geometry on sweeping jet actuator performance. *Fluids*, 7(2), 69.
- &Alam, M., &Cuthbertson, M. T., &&Marshall, T., &&Richmond, I., &&Matic, K., and **Kara, K.** (2022). Characterization of Sweeping Jet Actuator Flow Field using DMD analysis. *MAE Graduate Research Symposium*, Mar 30, 2022, Stillwater, OK.
- Tabassum, A., &Vuppala, R. K., Bai, H., and **Kara, K.** (2021). Variance reduction of quadcopter trajectory tracking in turbulent wind. *IFAC-PapersOnLine*, 54(20), 102-107.
- &Oz, F., and **Kara, K.** (2020). Jet oscillation frequency characterization of a sweeping jet actuator. *Fluids*, 5(2), 72.
- **Kara, K.**, Kim, D., and Morris, P. J. (2018). Flow-separation control using a sweeping jet actuator. *AIAA journal*, 56(11), 4604-4613.

Highlights (&Graduate Student and &&Undergraduate Student supervised in Kara's group)

- Since 2019, the Kara Lab has been nurturing undergraduate research excellence. Sixteen students have worked on significant projects, resulting in notable outcomes. An undergraduate research assistant (URA) has published his work in the Journal of Spacecraft and Rockets. At the same time, 6 URAs have presented their research at international conferences hosted by the American Institute of Aeronautics and Astronautics (AIAA) and the American Physical Society (APS). Additionally, 11 URAs have showcased their work at regional conferences.
- 1st Place, Best Undergraduate Poster Presentation, &&Peyton Pierson, 5th Annual MAE GRS, 2023.
- 3rd Place, Best Undergraduate Poster Presentation, &&Tuyen Nguyen, 5th Annual MAE GRS, 2023.
- Best Oral Presentation, &Furkan Oz, 5th Annual MAE Graduate Research Symposium, 2023.
- Best Graduate Poster Presentation, &Rohit Vuppala, 5th Annual MAE Graduate Research Symposium, 2023.
- &Furkan Oz, Visiting graduate student researcher, NASA Ames Research Center, Summer 2023.
- &Rohit Vuppala, Visiting graduate student researcher, Computational Physics and Methods group (CCS-2), Los Alamos National Laboratory, Summer 2023.
- &Rohit Vuppala, Roy and Virginia Dorrough Distinguished Graduate Fellowship, 2022 and 2023.
- &Rohit Vuppala and Kursat Kara, "Introduction to Scientific Machine Learning" workshop as part of the DataByte workshop series at Edmond Low Library, 2023.
- Otis Hodson is a high school student who shadowed and explored computational aerodynamics (2023).
- Executive Committee Member: National Energy Research Scientific Computing Users Group (2022 –).
- Member of the NSF ACCESS Allocation Review Committee (2022 –).
- Senior Member of the American Institute of Aeronautics and Astronautics (2010 –).
- Technical Co-Chair of AIAA Aviation 2020 Applied Aerodynamics Conference, A Virtual Event.
- Co-Chair of the 40th AIAA/ASME Symposium, Stillwater, OK, Apr 3, 2021.
- Technical Report Judge in AIAA Design, Build, Fly Competition (2012 – date).