

**Curriculum Vitae of  
Baki M. Cetegen  
United Technologies Chair Professor  
Department of Mechanical Engineering  
University of Connecticut, Storrs, 06269-3139**

**EDUCATION:**

Ph. D. in Mechanical Engineering: **California Institute of Technology**, June 1982  
Thesis: Entrainment and Flame Geometry of Fire Plumes

M.S. in Mechanical Engineering: **University of California, Berkeley**, November 1979  
Thesis: Study of Performance of a Plasma Jet Igniter.

B.S. in Mechanical Engineering: **Bosphorus University** (formerly Roberts College), Istanbul, Turkey, June 1978. *Magna cum laude* and double-major in Physics (Engineering school valedictorian)

**PROFESSIONAL EMPLOYMENT:**

2011 - present **United Technologies Chair Professor**, Mech. Eng. UConn  
2017-2018 **Visiting Professor** at Laboratoire d'Energetique Moleculaire et Macroscopique, Combustion (EM2C), CNRS et Centrale-Supelec, Paris, France  
2017 Visiting engineering consultant, Pratt & Whitney Aircraft Engines, East Hartford, CT  
2006 – 2015 **Department Head, Mechanical Engineering**, UConn, Storrs  
1999 - 2011 **Professor of Mechanical Engineering**, UConn, Storrs, CT  
2002 **Visiting Research Professor**, Laboratoire d'Energetique Moleculaire et Macroscopique, Combustion (EM2C), CNRS et Ecole Centrale Paris, France  
1994 - 1999 **Associate Professor of Mechanical Engineering**, UConn, Storrs  
1994 **Visiting Professor in Mechanical Engineering**, Yale University, New Haven, CT  
1987 - 1993 **Assistant Professor of Mechanical Engineering**, University of Connecticut, Storrs, also Adjunct Assistant Professor of Chemical Engineering  
1986 - 1987 **Research Fellow**, University of California, Irvine, CA  
1984 - 1986 **Group Leader**, Energy and Environmental Research Corporation, Irvine, CA  
1982 - 1984 **Research Engineer**, Energy and Environmental Research Corporation, Irvine, CA  
1981 - 1982 **Research Fellow**, California Institute of Technology, Pasadena, CA

**RESEARCH INTERESTS AND AREAS:**

Chemically reacting flows and plasmas, pollution from combustion, supersonic combustion, fluid mechanics and heat transfer in droplets injected into plasmas and flames, optical diagnostics of high and low temperature reacting and non-reacting flows, optical diagnostics of fuel cells, dynamics and blow-off characteristics of bluff-body stabilized premixed flames, flame-vortex interactions, detonation waves and shock induced mixing in gaseous flows.

**AWARDS AND HONORS:**

- Elected Fellow, The Combustion Institute, 2019
- Elected Member, Connecticut Academy of Science and Engineering, 2008
- Combustion Institute Central States Section Combustion Art Competition, 2007
- Outstanding Mechanical Engineering Faculty Award, 2001
- Fellow, American Society of Mechanical Engineers (ASME)
- NASA Conn. Space Grant Consortium Fellowship, 1992

- Caltech, Tuition Fellowships and Research Assistantships, 1979-1982
- UC, Berkeley, Tuition Fellowship, Teaching and Research Assistantships, 1978-1979
- Valedictorian of the 1978 Engineering Graduating Class at Bosphorus University, Turkey

#### **MEMBERSHIP IN PROFESSIONAL SOCIETIES:**

- American Society of Mechanical Engineers (ASME)
- American Society of Engineering Education (ASEE)
- Combustion Institute
- Sigma Xi Research Honor Society
- Pi Tau Sigma UConn chapter, Honorary member
- American Institute of Aeronautics and Astronautics (AIAA)

#### **PROFESSIONAL ACTIVITIES:**

- Past President, Connecticut Academy of Science and Engineering (CASE), 2020-2022
- President, Connecticut Academy of Science and Engineering (CASE), 2018-2020
- Vice President, Connecticut Academy of Science and Engineering (CASE), 2016-2018
- Governing Council Member, Connecticut Academy of Science and Engineering (CASE), 2014-2018
- Member, Capitol Region Education Council (CREC) Academy of Aerospace and Engineering Advisory Board, 2012 - present
- Chairman, Executive Committee, Combustion Institute Eastern States Section, 2009-2011
- Vice Chairman, Executive Committee, Combustion Institute Eastern States Section, 2007-2009
- Member, Center for Clean Energy Engineering (C2E2) Advisory Board, 2008 - 2015
- Member, Executive Committee, Combustion Institute Eastern States Section, 1999 -2007
- Treasurer, Combustion Institute Eastern States Section, 1999 - 2007
- Member of publications review committee for the 23<sup>rd</sup> –37<sup>th</sup> Symposia (International) on Combustion
- Reviewer on proposal review panels for NSF, DOE and NASA
- Session and Colloquia Chairman at the Eastern States Meetings of the Combustion Institute
- Reviewer for the following journals: Journal of Fluid Mechanics, Combustion and Flame, Combustion Science and Technology, Int’l Journal Heat and Mass Transfer, AIAA Journal Physics of Fluids, ASME Journal of Heat Transfer, Experiments in Fluids, Int’l Journal of Heat and Fluid Flow, Journal of Materials Research, Scripta Materialia

#### **PUBLICATIONS:**

**Citations as of 06/2021:** Scopus: Total 4025, h-index: 35  
Google Scholar: 5745, h-index: 42

#### **Journal articles:**

99. Grasso, G., Snyder K., Poettgen, B. K. and Cetegen, B. M., “Heat Transfer Characterization of Effusion Jet Cooled Panels Exposed to Combustion Environment using Infrared Thermography,” to be submitted to International Journal of Heat and Mass Transfer, 2021
98. Grasso, G., Snyder K. and Cetegen, B. M., “Application of Planar Rayleigh Scattering for Measurement of Gas Temperature Distributions in Effusion Jet Cooled Panels Exposed to High Temperatures,” submitted to ASME Journal of Heat Transfer, 2021

97. Roy Chowdhury, B. and Cetegen, B. M., “Experiments on the combined effects of free stream flow turbulence and fuel type on blowoff characteristics of bluff body stabilized premixed flames,” to be submitted for publication in *Combustion and Flame*, 2020
96. Dayton, J. W., Poettgen, B. K., and Cetegen, B. M., “Non-isothermal mixing characteristics in the extreme near-field of turbulent jets in hot crossflow: Effects of jet exit turbulence and velocity profile,” *Physics of Fluids*, Vol. 32, Issue 11, 2020, <https://doi.org/10.1063/5.0026860>
95. Roy, R. and Cetegen B. M., “Dynamics of 2D, V-shaped bluff-body stabilized turbulent premixed flames near and away from blowoff with different gaseous fuels,” *Combustion Science and Technology*, 2020, <https://doi.org/10.1080/00102202.2020.1726330>
94. Dayton, J. W., Poettgen, B. K., Linevitch Jr., K. and Cetegen, B. M., “Non-isothermal mixing characteristics of a turbulent jet in a hot crossflow,” *Physics of Fluids*, Vol. 31, pp. 125104:1-17, 2019
93. Wu, B., Zhao, X., Roy Chowdhury, B. Cetegen, B. M., Xu, C, and Lu, T., “A numerical investigation of the flame structure and blowoff characteristics of a bluff-body stabilized turbulent premixed flame,” *Combustion and Flame*, Vol. 202, pp. 376-393, 2019
92. Basu, S., Chaudhuri, S., Cetegen, B. M. and Saha, A., “Mixing Dynamics in Interacting Vortices,” pp. 317-344, *Energy for Propulsion: A Sustainable Technologies Approach*, Editors: A. K. Runchal, A. K. Gupta, A. Kushari, A. De and S. K. Aggarwal, Springer, 2018
91. Dayton, J., Linewitch, K. Jr. and Cetegen, B. M., “Ignition and flame stabilization of a pemixed reacting jet in vitiated crossflow,” *Proceedings of the Combustion Institute*, Vol. 37, pp. 2417-2424, 2019
90. Roy Chowdhury, B. and Cetegen, B. M., “Effects of fuel properties and free stream turbulence on characteristics of bluff-body stabilized flames,” *Combustion and Flame*, Vol. 194, pp. 206-222, 2018
89. Roy Chowdhury, B. and Cetegen, B. M., “Effects of free stream flow turbulence on blowoff characteristics of bluff-body stabilized premixed flames,” *Combustion and Flame*, Vol. 190, pp. 302-316, 2018
88. Roy Chowdhury, B. and Cetegen, B. M., “Experimental study of the effects of free stream turbulence on characteristics and flame structure of bluff body stabilized conical flames,” *Combustion and Flame*, Vol. 178, pp. 311-328, 2017,
87. Wagner, J. A., Renfro, M. W. and Cetegen, B. M., “Premixed jet flame behavior in a hot vitiated crossflow of lean combustion products,” *Combustion and Flame*, Vol. 176, pp. 521-533, December 2016, <http://dx.doi.org/10.1016/j.combustflame.2016.11.014>
86. Roy Chowdhury, B., Wagner, J. A. and Cetegen, B. M., “Experimental study of the effect of turbulence on the structure and dynamics of a bluff-body stabilized lean premixed flame,” *Proceedings of the Combustion Institute*, Vol. 36, pp. 1853-1859, 2017, <http://dx.doi.org/10.1016/j.proci.2016.07.125>
85. Wagner, J., Grib S., Dayton J., Renfro M. W. and Cetegen B. M., “Flame stabilization analysis of a premixed reacting jet in vitiated crossflow,” *Proceedings of the Combustion Institute*, Vol. 36, pp. 3763-3771, 2017, <http://dx.doi.org/10.1016/j.proci.2016.07.020>

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83. Wagner, J. A., Grib, S. W., Renfro, M. W. and Cetegen, B. M., "Flowfield measurements and flame stabilization of a premixed reacting jet in vitiated crossflow," *Combustion and Flame*, Vol. 162, pp. 3711-3727, 2015
82. Nordeen, C. A., Schwer, D., Schauer, F., Hoke, J., Barber, T. and Cetegen, B. M., "Role of Inlet Reactant Mixedness on the Thermodynamic Performance of a Rotating Detonation Engine," *Shock Waves*, Vol. 25, No. 3, pp. 1-12, May 2015
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80. Biswas, S., Kopp-Vaughan, K. M., Renfro, M. W. and Cetegen, B. M., "Phase-resolved Characterization of Forced Conical Premixed Flames Near and Far from Blowoff," *Combustion and Flame*, Vol. 160, pp.2843-2855, 2013
79. Tuttle, S. G., Chaudhuri S., Kopp-Vaughan, K. M., Jensen, T., Cetegen, B. M., Renfro, M. W., and Cohen, J., "Lean blowoff behavior of asymmetrically fueled bluff-body stabilized flames," *Combustion and Flame*, Vol. 160, No. 9, pp. 1677-1692, 2013
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77. Tuttle, S. G., Chaudhuri S., Kostka S., Kopp-Vaughan, K. M., Jensen, T., Cetegen, B. M. and Renfro, M. W., "Time-resolved blowoff transition measurements for two dimensional bluff-body stabilized flames in vitiated flow," *Combustion and Flame*, Vol. 159, No.1, pp. 291-305, 2012
76. Chaudhuri S., Kostka S., Renfro, M. W. and Cetegen, B. M., "Blowoff mechanism of harmonically forced bluff-body stabilized turbulent premixed flames," *Combustion and Flame*, 2011, Vol. 159, No. 2, pp. 638-640, 2012
75. Saha, K. and Cetegen, B. M., "Modeling of precipitate formation in solution precursor droplets in a microwave plasma," *Journal of Thermal Spray Technology*, Vol. 21, No. 2, pp.211- 225, March 2012, DOI: 10.1007/s11666-011-9712-3
74. Quinn, G. and Cetegen, B. M., "Heat transfer in an evaporating liquid film flowing over a rotating disk," *Experimental Heat Transfer*, Vol. 24, pp. 88-107, 2011
73. Saha, K., Chaudhuri, S. and Cetegen, B. M., "Modeling of ceramic particle heating and melting in a microwave excited plasma," *ASME Journal of Heat Transfer*, Vol. 133, pp. 031002-1-10, March 2011
72. Chaudhuri, S., Kostka, S., Tuttle, S. G., Renfro, M. W. and Cetegen, B. M., "Blowoff mechanism of two dimensional bluff-body stabilized turbulent premixed flames in a prototypical rig," *Combustion and Flame*, Vol. 158, pp. 1358-1371, 2011
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69. Chaudhuri, S., Kostka, S, Renfro, M. W. and Cetegen, B. M., "Blowoff dynamics of bluff body stabilized turbulent premixed flames," *Combustion and Flame*, Vol. 157, pp. 790-802, 2010
68. Quinn, G. and Cetegen, B. M., "Effect of surfactant addition on boiling heat transfer in a liquid film flowing in a diverging open channel," *Int'l Journal of Heat and Mass Transfer*, Vol. 53, pp. 245-253, 2010
67. Quinn, G. and Cetegen, B. M., "Investigation of heat transfer and bubble dynamics in a boiling thin liquid film flowing over a rotating disk," *Int'l Journal of Thermal Science*, Vol. 49, pp. 643-652, 2010
66. Cetegen, B. M. and Basu, S., "Review of modeling of liquid precursor droplets and particles injected into plasmas and high velocity oxy-fuel (HVOF) flame jets for thermal spray applications," *Journal of Thermal Spray Technology*, Vol. 18, No. 5-6, pp. 769-793, December 2009, DOI: 10.1007/s11666-009-9365-7
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63. Chaudhuri, S. and Cetegen B. M., "Transfer function characteristics of bluff-body stabilized conical premixed flames in the presence of upstream spatial mixture gradients," *Combustion and Flame*, Vol. 156, pp. 706-720, 2009
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55. Basu, S. and Cetegen, B. M., "Modeling of thermo-physical processes in liquid ceramic precursor droplets injected into a plasma jet," *Int'l Journal of Heat and Mass Transfer*, Vol. 50, pp. 3278 – 3290, 2007
54. Basu, S., Renfro, M. W. and Cetegen, B. M., "Spatially-resolved optical measurements of water partial pressure and temperature in a PEM fuel cell under dynamic operating conditions," *Journal of Power Sources*, Vol. 162, pp. 286-293, 2006
53. Basu, S. and Cetegen, B. M., "Effect of hydraulic jump on hydrodynamics and heat transfer in a thin liquid film flowing over a rotating disk analyzed by integral method," *ASME J. Heat Transfer*, Vol. 129, pp. 1-7, May 2007
52. Basu, S. and Cetegen, B. M., "Soot topography in a planar diffusion flame wrapped in a line vortex," *Combustion and Flame*, Vol. 146, No. 4 pp. 687-697, 2006.
51. Basu, S., Renfro, M. W., Gorgun, H. and Cetegen, B. M., "In-situ simultaneous measurements of temperature and water partial pressure in a PEM fuel cell under steady state and dynamic cycling," *Journal of Power Sources*, Vol. 159, pp. 987-994, 2006.
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49. Xie, L., Chen, D., Ozturk, A., Wu, F., Ma, X., Jordan, E. H., Padture, N.P., Cetegen, B.M. and Gell, M., "Formation of Vertical Cracks in Solution-Precursor Plasma-Sprayed Thermal Barrier Coatings," *Surface and Coatings Technology*, Vol. 201, No. 3-4, pp. 1058-1064, 2006
48. Chaparro, A., Landry, E. and Cetegen, B. M., "Transfer function characteristics of bluff-body stabilized conical V-shaped turbulent premixed flames" *Combustion and Flame*, Vol. 145, pp. 290-299, 2006
47. Cetegen, B. M., "Scalar Mixing in the Field of a Gaseous Laminar Line Vortex" *Experiments in Fluids*, Vol. 40, pp. 967-976, 2006
46. Basu, S. and Cetegen, B. M., "Analysis of hydrodynamics and heat transfer in a thin liquid film flowing over a rotating disk by integral method," *ASME J. Heat Transfer*, Vol. 128, pp. 217-225, 2006
45. Chaparro, A. and Cetegen, B. M., "Blow-off characteristics of bluff-body stabilized conical premixed flames under upstream velocity modulation," *Combustion and Flame* Vol. 144, pp. 318-335, 2006
44. Ozturk, A. and Cetegen B. M., "Experiments on ceramic formation from liquid precursor spray axially injected into an oxy-acetylene flame," *Acta Materialia*, Vol. 53, pp. 5203 – 5211, 2005
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29. Soteriou, M. C., Dong, Y. and Cetegen, B. M., "Lagrangian simulation of the unsteady near field dynamics of planar buoyant plumes," *Physics of Fluids*, Vol. 14, No. 9, pp. 3118-3140, 2002
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25. Hermanson, J. C. and Cetegen, B. M., "Shock-induced mixing of non-homogeneous density turbulent jets," *Physics of Fluids*, Vol. 12, No.5, pp. 1210-1225, 2000
24. Cetegen, B. M. and Dong, Y., "Experiments on instability modes of buoyant diffusion flames and effects of ambient atmosphere on instabilities," *Experiments in Fluids*, Vol. 28, No. 6, pp. 546-558, 2000
23. Cetegen, B. M., "Integral analysis of planar and axisymmetric steady laminar buoyant diffusion flames," *Combustion Theory and Modeling*, Vol. 3, pp.13-32, 1999
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20. Cetegen, B. M., "A phenomenological model for near-field fire plume entrainment," *Fire Safety Journal*, Vol. 31, pp. 299 - 312, 1998
19. Cetegen, B. M., Dong, Y., and Soteriou, M. C., "Experiments on stability and oscillatory behavior of planar buoyant plumes," *Physics of Fluids*, Vol. 10, No. 7, pp. 1658 - 1665, 1998
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17. Cetegen, B. M., "Behavior of naturally oscillating and periodically forced axisymmetric buoyant plumes of helium and helium-air mixtures," *Physics of Fluids*, Vol. 9. No. 12 , pp. 3742-3753, 1997
16. Cetegen, B. M., "Measurements of instantaneous velocity field of a non-reacting pulsating buoyant plume by particle image velocimetry," *Combustion Science and Technology*, Vol. 123,:1-6, pp. 377 - 387, 1997
15. Cetegen, B. M. and Kasper, K. D., "Experiments on the oscillatory behavior of buoyant plumes of helium and helium/air mixtures," *Physics of Fluids*, Vol. 8 (11), pp. 2974-2984, 1996
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12. Cetegen, B. M. and Ahmed, T., "Experiments on the periodic instability of buoyant plumes and pool fires," *Combustion and Flame*, Vol.93, pp.157-184, 1993



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2. Zukoski, E. E., Kubota, T. and Cetegen, B. M., "Entrainment in fire plumes," *Fire Safety Journal*, Vol. 3, pp. 107 - 121, 1980/81
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#### **Patents:**

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17. Cetegen, B. M., "Characteristics of Oscillating Buoyant Plumes," presented at the Symposium: Fluid Mechanics of Fires in honor of Prof. E. E. Zukoski, *U.S. - Japan Joint Panel on Fire Research*, NIST, Gaithersburg, MD, March 15, 1995
16. Tageldin, M. S. and Cetegen, B. M., "Dispersion and Evaporation of Liquid Droplets in a Differentially-heated Confined Mixing Layer," paper presented at the 1995 Eastern States Meeting of the Combustion Institute, Worcester Polytechnic Institute, October 15 - 18, 1995
15. Tageldin, M. S. and Cetegen, B. M., "Size Selective Dispersion of Droplets in an Isothermal Confined Mixing Layer," presented at the *1995 Eastern States Meeting of the Combustion Institute*, Worcester Polytechnic Institute, October 15 - 18, 1995
14. Ahmed, T. A. and Cetegen, B. M., "Prediction of Induced Radial Velocity due to Vortical Structures in Pool Fires," paper presented at the *1995 Eastern States Meeting of the Combustion Institute*, Worcester Polytechnic Institute, October 15 - 18, 1995
13. Cetegen, B. M. and Kasper, K.D., "Phase-resolved Velocity Field Measurements in Plumes of Helium/Air Mixtures," paper presented at the 1994 Eastern States Meeting of the Combustion Institute, December 4 - 7, 1994, Clearwater, FL.
12. Hermanson, J. C. and Cetegen, B. M., "The Interaction of Compressible Vortex Rings with Normal Shock Waves," paper presented at the *1993 Eastern States Meeting of the Combustion Institute*, Princeton, NJ, October 27, 1993
11. Cetegen, B. M. and Alessandri, D. S., "Experimental Study of Mixing during Shock-Turbulent Jet Interaction," paper presented at the *19th International Symposium on Shock Waves*, Marseille France, July 27, 1993
10. Ahmed, T. A. and Cetegen, B. M., "Further Investigations on Puffing in Buoyant Plumes and Pool Fires," paper presented at the *1993 Joint Central and Eastern States Meeting of the Combustion Institute*, New Orleans, LA, March 17, 1993

9. Alessandri, D. Y. and Cetegen, B. M., "Mixing During Shock / Jet Interaction," paper presented at the *1993 Joint Central and Eastern States Meeting of the Combustion Institute*, New Orleans, LA, March 16, 1993
8. Tageldin, M. S. and Cetegen, B. M., "Droplet Size and Velocity Measurements in a Two-dimensional, Differentially-heated, Droplet-laden, Turbulent Mixing Layer," paper presented at the *1993 Joint Central and Eastern States Meeting of the Combustion Institute*, New Orleans, LA, March 16, 1993
7. Soteriou, M. C., Knio, O. M., Ghoniem, A. F. and Cetegen, B. M., "Simulations of Flow-Combustion Interactions in a Spatially Developing Mixing Layer," *AIAA 30th Aerospace Sciences Meeting*, Paper No: 92-0081, Reno NV, January 1992
6. Mohamad, N. and Cetegen, B. M., "Experiments on High Schmidt Number Mixing in an Isolated Two Dimensional Vortex," paper presented at the *Annual meeting of the American Institute of Chemical Engineering (AIChE)*, November 20, 1991, Los Angeles CA
5. Mohamad, N. and Cetegen, B. M., "Experiments on Molecular Mixing in the Field of a Vortex," paper presented at the *Combustion Institute Eastern States Meeting*, Cornell University, Ithaca, N.Y., October 1991
4. Pines, D. S. and Cetegen, B. M., "CO Oxidation in a Time-dependently Stretched Fuel Strip with Radiative Heat Losses," presented at the *Combustion Institute Eastern States Meeting*, Cornell University, Ithaca, N.Y., October 1991
3. Foster, S. G., Tageldin, M. and Cetegen, B. M., "Dispersion and Evaporation of Liquid Droplets in a Turbulent Planar Mixing Layer," Paper AIAA-91-2312, *AIAA/ASME/SAE/ASEE 27th joint Propulsion Conference*, June 24-26, 1991, Sacramento, CA
2. Cetegen, B. M. and Ahmed, T., "Experimental Study of Puffing Behavior in Pool Fires," Presented at the *Combustion Institute Eastern States Meeting*, Orlando FL, November 1990
1. Cetegen, B. M. and Mohamad, N., "Experiments on Liquid Mixing and Reaction in an Isolated 2D Vortex," paper resented at the *Combustion Institute Eastern States Meeting*, Orlando FL, November 1990

## **RESEARCH GRANTS AND CONTRACTS:**

### **Extramural research awards at UConn:**

38. Grant titled "Experimental study of bluff-body stabilized highly turbulent premixed flames using pre-vaporized liquid fuels," National Science Foundation, \$320,000, Period: 01/19-12/21
37. Contract titled "Flow and thermal field characterization in effusion cooled liner panels," United Technologies Pratt and Whitney, \$65,000, Period: 01/19-12/19
36. Contract titled "Studies on premixed reacting jets in vitiated crossflow: Study of effects of flame attachment with emphasis on combustor durability," United Technologies Pratt and Whitney, \$70,000, Period: 01/18-12/18
35. Contract titled "Review of heat transfer modeling approaches for combustor liners," United Technologies Pratt and Whitney, \$81,595, Period: 02/17-08/17
34. Contract titled "Studies on premixed reacting jets in vitiated crossflow: Jet and Free stream turbulence effects," United Technologies Pratt and Whitney, \$65,000, Period: 01/17-12/17
33. Contract titled "Studies on premixed reacting jets in vitiated crossflow," United Technologies Pratt and Whitney, \$68,000, Period: 01/16-12/16

32. Contract titled "Modeling and optimizing turbines for unsteady flow," subcontract from Hypercomp Inc, DARPA STTR-Phase II, \$254,770, Period: 07/14-12/16
31. Contract titled "Experimental studies on reacting jets in crossflow" (with M. W. Renfro), United Technologies Pratt and Whitney, \$68,000, Period: 01/15-12/15
30. Contract titled "Experimental studies on new combustion concepts" (with M. W. Renfro), United Technologies Pratt and Whitney, \$110,000, Period: 01/14-12/14
29. Contract titled "Experimental studies on premixed flame stabilization" (with M. W. Renfro), United Technologies Pratt and Whitney, \$98,643, Period: 01/13-12/13
28. Department of Education, Graduate Assistance in Areas of National Need: Clean Energy, (with Mun Y. Choi, Radenka Maric, Prabhakar Singh, Peter Luh), \$399,798, Period: 8/12-8/15.
27. Contract titled "Experimental studies on new main combustor concepts" (with M. W. Renfro), United Technologies Pratt and Whitney, \$100,000, Period: 01/12-12/12
26. Contract titled "Thermodynamic Modeling of a rotating detonation engine," AFRL/Innovative Scientific Solutions Inc., \$120,778, Period: 9/10-12/11
25. Contract titled "Ignition Studies of Premixed Hydrocarbon and Vitiated Gas Mixtures at Atmospheric and Low Pressure (with M. W. Renfro), DoD/Air Force/Innovative Scientific Solutions, Inc., \$90,000, Period: 7/10-12/11
24. Grant titled "Partially-premixed bluff-body flame dynamics and acoustic coupling in vitiated flows (with M. W. Renfro), National Science Foundation, \$350,000, Period: 05/10-05/13
23. Contract titled "Dynamics of bluff-body stabilized premixed and partially premixed flames near blowoff" (with M. W. Renfro), Phase II Continuation, United Technologies Pratt and Whitney, \$100,000, Period: 01/10-12/10
22. Contract titled "Dynamics of bluff-body stabilized premixed and partially premixed flames near blowoff" (with M. W. Renfro), United Technologies Pratt and Whitney, \$100,000, Period: 01/09-12/09
21. Grant titled "Innovative Optical Diagnostic Tools for Fuel Cell Development and Operation Control," (with M. W. Renfro), Connecticut Innovations Inc. and United Technologies Power, \$264,000 with 0 % overhead, Period: 8/07 to 8/09
20. Grant titled "Nanocomposite Oxides for High Durability Missile Domes", Co-investigator (20 %) with E. H. Jordan, (40 %) M. Gell (20 %) and M. Aindow (20 %), DARPA and Raytheon Inc., \$2,808,000 Period: 5/07 to 10/10
19. Grant titled "Experimental and Computational Study of Bluff-body Flame Stabilization with Non-homogeneous Upstream Mixing," Principal Investigator, Chemical and Thermal Systems Division, National Science Foundation, \$200,000. Period: 5/06 – 5/09
18. Grant titled "Solution Spray Plasma Processing of nano-structured ceramic coatings" ", (Co-investigators: M. Gell, E. Jordan, N. Padture) Office of Naval Research, \$ 1,000,000, Prof. Cetegen's portion: \$120,000, Period: 1/05 – 12/07
17. Grant titled "Evaluation of emission performance of municipal buses with hybrid Diesel-electric propulsion," Connecticut Department Of Transportation and CTTRANSIT, \$122,725, Period: 1/03 to 6/05

16. Grant titled "In-situ optical diagnostics for measurements of water vapor concentration and temperature in PEM fuel cell membrane-electrode assemblies", (Co-investigator: M. Renfro), Army Research Office, \$143,777, Period: 1/03 to 7/05
15. Grant titled "Solution Spray Plasma Processing of nano-structured ceramic coatings" ", (Co-investigators: M. Gell, E. Jordan, N. Padture), Office of Naval Research, \$ 1,000,000, Prof. Cetegen's portion: \$150,000 for 3 years (2001-2004)
14. Grant titled "Transport phenomena in thin rotating liquid films including nucleate boiling", (with Amir Faghri), \$340,000, 3.5 years NASA Microgravity Fluid Physics program, June 2000 – December 2004
13. Grant titled "Advanced Coating Technology Development for Enhanced Durability and Reduced Cost in Naval Applications", Multi-investigator award: Bergman, Cetegen, Gell, Jordan, Padture, Klemens and Inframat Corp. Office of Naval Research, "Thermal Spray Diagnostics, Modeling and Control" Task of Cetegen and Bergman, \$600,000, 1997-2001
13. Contract titled "Arc cut-off in high power circuit breakers", General Electric Power Systems, \$100,000, Duration 7/00 to 6/02
12. Contract continuation titled "Feasibility Study of Non-contact conductivity measurements using arc plasmas," \$32,000 (with E. K. Dabora), Probot Inc., Duration 1/1998 - 8/1998
11. Contract titled "Feasibility Study of Non-contact conductivity measurements using arc plasmas," \$63,000 (with E. K. Dabora), Probot Inc., Duration 8/1996 -12/1997
10. Senior Design Project grants for the academic year 1997-1998 and 1996- 1997, United Technologies Research Center, \$10,000 "Novel fuel injection modulation schemes for land-based gas turbine combustion control "
9. Equipment grant award "Optical Instrumentation for Measurements of Particle Temperature, Velocity and Size in Thermal Sprays," U. S. Army Research Office, \$87,300 (with Prof. P. Strutt), 3/1997- 3/1998
8. Grant titled "Development of a High Speed Combustion Facility for Gas Turbine Research" (with J.C. Bennett, E. K. Dabora and E. Jordan), Elias Howe Program, Connecticut Innovations Inc. \$128,900 + \$42,500 Matching Funds, from UCRF & School of Engineering, 8/1995 - 8/1998.
7. Grant titled "Demonstration of Low Capital Technologies to Reduce Diesel Bus Engine Emissions", U. S. and Connecticut Departments of Transportation under Federal Joint Highways Program, 1991-1993: \$49,200, 1993 - 1994: \$32,350, 1994-1995: \$49,900, (with Prof. E. K. Dabora)
6. Equipment grant titled "Electronic Image Retrieval System for a High Speed Framing/Streak Camera", Elias Howe Equipment Grant from Connecticut Innovations Inc., \$25,537 + \$8,513 UConn Research Foundation Matching Funds, Duration: 6/1992 - 6/1993, (with Prof. E. K. Dabora)
5. Grant titled "Experimental Study of Buoyancy Induced Instabilities in Turbulent Plumes and Diffusion Flames", National Science Foundation (NSF) Engineering Initiation Grant, CTS 8909176, \$59,941, Duration: 6/89 - 6/92, Principal Investigator
4. Grant titled "Quantitative Comparison of Laser Induced Fluorescence and Molecular Spectroscopy in Combustion Systems", Apollos Kinsley Grant from Connecticut Department of Higher Education, \$ 1,000, Duration: 6/1991 - 5/1992, (with Profs. E. K. Dabora, UConn. and L. Huewell, Wesleyan University)

3. Equipment grant titled "Acquisition of a Tunable Dye Laser and Frequency doubling Optics", Elias Howe Equipment Grant from Connecticut Department of Higher Education, \$27,500 + \$10,000 ME Dept Matching Funds + \$12,500 UConn. Research Foundation Matching Funds, Duration: 6/1991 - 5/1992, (with Profs. E. K. Dabora and B. D. Shaw)
2. Equipment grant titled "Spatially and Temporally Resolved Imaging of Combustion Phenomena", Elias Howe Equipment Grant from Connecticut Department of Higher Education, \$151,200 + \$10,000 (School of Engineering Matching funds), Duration: 6/90 - 6/91, (with Profs. E. K. Dabora and B. Shaw)
1. Grant titled "A Study of Oblique Detonations for Supersonic Combustion", \$191,609 + UTRC Matching Funds, Apollos Kinsley Grant from Connecticut Department of Higher Education, Duration: 7/88 - 6/90, (with Prof. Eli K. Dabora)

**Intramural research awards at UConn:**

11. Grant titled "Development of a rotating detonation engine test rig," \$25,000, Duration: 5/16/ - 04/17
10. Grant titled "Rapid Formation of Detonations in Two-phase fuel-air mixtures for application in pulsed detonation engines", (with E. K. Dabora), \$19,805, Duration: 6/01 - 12/02
9. Equipment Grant titled "Acquisition of High Speed Electronic Imaging System" (with W. Chiu, N. Olgac, E. Jordan, R. Pitchumani, K. Murphy) UConn. School of Engineering, \$28,025, May 2001
8. Grant award "ME 271 Senior Laboratory Experiment in Thermo/Fluids: Pollution Generation in Flames", \$17,156, Engineering Academy of Southern New England (EASNE), 8/95 - 12/95
7. Grant award "Diesel Bus Emissions/Alternate Fuels", from EPA through UConn. Pollution Prevention R&D Center, \$18,500, Duration : 1993-94, (with Prof. E. K. Dabora)
6. Grant award "Development of a Versatile Two-dimensional Particle Image Velocimetry System", \$8,981, Duration: 1/93 - 12/93, (with Prof. J. C. Bennett)
5. Grant award "Mixing during Collision of a Vortex Pair and a Shock Wave", (with Prof. E. K. Dabora), UConn. Research Foundation, \$10,014, Duration: 6/91 - 5/92,
4. Grant award "Experimental Study of Mixing and Reaction in a 2-D Vortex", UConn. Research Foundation, \$7,666, Duration: 1/90 - 12/90, Principal Investigator
3. Grant titled "Experimental Study of Mixing and Chemical Reaction in Particle Laden Jets Injected into a SO<sub>2</sub> Environment", Environmental Research Institute, \$25,000, Duration: 7/88 - 7-90, Principal Investigator
2. Grant titled "Experimental Study of a Buoyancy Induced Instability in Turbulent Diffusion Flames", UConn. Research Foundation, \$8,220 + \$ 2,000 School of Engineering Funds, Duration: 1/88 - 6/89, Principal Investigator
1. Grant titled "Combustion Species Monitoring System", An Equipment acquisition grant from UConn. Research Foundation, \$33,710, Duration 12/88 - 12/89, (with Prof. Douglas Cooper of Chemical Engineering)

**Contracts received at Energy and Environmental Research Corp:**

2. Cetegen, B. M., Johnson, T. R., Payne, R., Moyeda, D. K., Sheldon, M. S., Li, W., Kindt, G. S., "Effective mixing processes for SO<sub>x</sub>, sorbent and coal combustion products," U. S. EPA Contract 68-02-4205, 1983-1985.

1. Cetegen, B. M. , Richter, W., Reese, J. L., LaFond, J., Folsom, B. A., Payne, R., “Evaluation of time/temperature history of gases and particles in the radiant furnace zone of pulverized coal fired steam generators,”, EPA Contract 68-02-3927, 1982-1984

## **GRADUATE STUDENTS**

### **Doctor of Philosophy (Current):**

1. James Dayton, “Experimental and computational studies of reacting jets in cross flow” Expected Graduation Date: 2021

### **Master of Science (Current):**

1. Gregory Grasso, “Planar laser induced Rayleigh temperature measurements in effusion cooled liner panels” Expected Graduation Date: 2021
2. Stephen Price, “Combined laser filtered Rayleigh scattering, PIV and PLIF in turbulent premixed flames”, Expected Graduation Date: 2021
3. Kevin Snyder, “Planar laser induced Rayleigh temperature measurements and IR imaging of effusion cooled liner panels” Expected Graduation Date: 2022
4. Nicholas Erskine, “Experimental investigation on the effects of highly turbulent premixed bluff-body stabilized flames,” Expected Graduation Date: 2022

### **Postdoctoral Fellow (Past):**

Dr. Craig Nordeen, Design of a single stage turbine for continuous rotating detonation engine applications

### **Doctor of Philosophy (Past):**

11. Bikram Roy Chowdhury, “Experimental investigation on the effects of free stream turbulence and fuel type on structure and blowoff characteristics of turbulent premixed bluff-body stabilized flames,” Graduation Date: 2017, Current Position: Postdoctoral Fellow, SANDIA Combustion Research Facility, Livermore, CA.
10. Jason A. Wagner, “Experimental Studies on Flow Field and Flame Stabilization of a Premixed Reacting Jet in Vitiated Crossflow,” Graduation Date: May 2016, Current Position: Research Engineer, Physical Sciences Inc., Andover, MA.
9. Craig Nordeen, “Investigations of continuous rotating detonations for propulsion applications”, Graduation Date: May 2014
8. Swetaprovo Chaudhuri, “Stability and Flame Dynamics of bluff-body stabilized premixed flames with upstream flow excitation and mixture gradients,” Graduation Date: August 2010, Current Position: Assistant Professor of Aerospace Engineering, Indian Institute of Science, Bangalore, India.
7. Gregory Quinn, “Heat Transfer in a Liquid Film Flowing over a Rotating Disk and a Diverging Open Channel with and without Boiling and Surfactant Addition”, Graduation Date: 2009, Current Position: Senior Engineer, Sea and Space Systems Division, UTC Hamilton-Sundstrand, Windsor Locks, CT
6. Saptarshi Basu, “Modeling and Optical Diagnostics of Reacting and Non-reacting Single and Multiphase Flows,” Graduation Date: 2007, Current Position: Associate Professor of Mechanical Engineering, Indian Institute of Science, Bangalore, India

5. Alper Ozturk, "Diagnostics and Modeling of Yttria-stabilized Zirconia Formation in Solution Precursor Plasma Spray Process," Graduation Date: 2005, Current Position: Engineering Group Manager, Corning Corporate Research and Development Center, Corning, NY
4. Sergey Y. Semenov, "Experimental Diagnostics and Modeling of Thermal Spray Deposition Processes of Nano-structured Wear resistant and Thermal barrier Coatings," Graduation Date: 2002, Current Position: Senior Research Engineer, Thermacor Corporation, Lancaster, PA
3. Weiduo Yu, "Optical Diagnostics of Thermal Spray Processes using Nano-agglomerates," Graduation Date: 1999, Senior Engineer, Pratt and Whitney, East Hartford
2. Mohamed Tageldin, "Dispersion and Evaporation of Droplets in a Two-dimensional, Differentially-heated, Turbulent Mixing Layer," Graduation Date: 1996, Last known position: Assoc. Prof. University of Cairo, Egypt
1. Tarek Ahmed, "Experimental Studies on the Instability of Buoyant Plumes and Pool Fires," Graduation date: 1995 Last known position: Engineer in Saudi Arabia

**Master of Science (Past):**

20. Benjamin K. Poettgen, "Experimental Methods for Studying Mixing and Heat Transfer Characteristics of Effusion Jets in a Vitiated Crossflow" Graduation Date: June 2020
19. Rishi Roy, "Experimental investigation of the dynamics and blowoff characteristics of bluff-body stabilized 2D, V-shaped turbulent premixed flames with different gaseous hydrocarbon fuels," Graduation Date: December 2018
18. Kyle Linevitch, Jr. "Near field mixing characteristics of a variable density non-reacting jet in a hot vitiated crossflow," Graduation Date: April 2018
17. George Lapaan, "Study of reacting jets in unvitiated and vitiated cross flow," Graduation Date: October 2014
16. Sayan Biswas, "Phase-resolved characterization of conical turbulent premixed flames: An investigation of forced blowoff dynamics," Graduation Date: June 2012
15. Trevor Jensen, "Stability and blowoff dynamics of bluff-body stabilized flames", Co-advised with Prof. M. Renfro, Graduation Date: July 2011
14. Arnab Roy, "High sensitivity gas species measurements by tunable diode laser spectroscopy Graduation Date: July 2010
13. Kaushik Saha, "Microwave plasma deposition of ceramics from liquid precursors," Graduation Date: July 2009
12. Ritobrata Sur, "Tunable diode laser absorption spectroscopy measurements of water vapor and carbon dioxide in fuel cell systems," Graduation Date: July 2009
11. Matthew W. Andel, "Stability of Conical Bluff-body Stabilized Premixed Flames with Upstream Mixture Gradients", Graduation Date 2008
10. Saptarshi Basu, "In-situ Optical Diagnostics in a PEM Fuel Cell using Near IR Absorption Spectroscopy," Graduation Date: 2004
9. Andres Chaparro, "Blow-off Characteristics of Conical Premixed Flames Subjected to Upstream Velocity Modulations," Graduation Date: 2004
8. Alper Ata, "Effects of D.C. Electric Fields and Acoustic Excitation on the Lean Limit Stability of Bluff-body Stabilized Conical Turbulent Premixed Flames," Graduation Date: 2003

7. Basar Ozar, "Experiments on Hydrodynamic and Thermal Behavior of Thin Liquid Films Flowing over a Rotating Disk," Graduation Date: 2002
6. Shibley Noman, "Emission Spectroscopy of Premixed Flames and High Temperature Arc Discharges," Graduation Date: 2002
5. Yan Dong, "Experimental and Numerical Study of the Unsteady Behavior of Planar Buoyant Plumes and Axisymmetric Diffusion Flames," Graduation Date: 1999
4. Kent D. Kasper, "Phase-resolved Velocity Field Measurements in Pulsating Buoyant Plumes and Pool Fires," Graduation Date: 1995
3. Bradley C. Dick, "An Experimental study of the Effects of Methyl-Tertiary-Butyl Ether (MTBE) on Internal Combustion Engine Emissions", Graduation Date: 1994
2. Daniel Allesandri, "Mixing Enhancement in Jets and Isolated Vortices by Shock Waves," Graduation Date: 1993
1. Nazri Mohamad, "An Experimental Study of Mixing and Chemical Reaction in a Vortex," Graduation Date: 1991

#### **INVITED TALKS AND SEMINARS:**

KAUST, VT-Tech, UCLA, UC Irvine, Northeastern University, Beihang University in China, Drexel University, Yale University, Rice University, MIT, NIST, Clemson University, WPI, Brown University, University of Washington, University of Southern California, University of Connecticut, Istanbul Technical University, Turkey, Bosphorus University, Istanbul Turkey, Koc University, Istanbul Turkey, University of Central Florida.

#### **TEACHING EXPERIENCE:**

##### **Undergraduate Level:**

- ME 2233 Thermodynamic Principles
- ME 2234 Applied Thermodynamics
- ME 238 Thermal Science
- ME 3239 Combustion for Energy Conversion
- ME 3250 Fluid Mechanics
- ME 3262 Thermo-Fluids Laboratory
- ME 3295 Sustainable Energy Sources and Systems
- ME 3295 & 3299 Special Topics in Mechanical Engineering and Independent Studies

##### **Graduate Level:**

- ME 5110 Advanced Thermodynamics
- ME 5320 Flow of Compressible Fluids I
- ME 6170 Combustion and Air Pollution Engineering
- ME 6173 Advanced Combustion
- ME 5341 Radiation Heat Transfer
- ME 6330 Advanced Measurement Techniques



- ME Independent Study in Mechanical Engineering

#### **ADMINISTRATIVE EXPERIENCE AND SERVICE:**

- ***Connecticut Academy of Engineering and Sciences CASE): President (2018-2020), Vice President (2018-2020), Governing Council Member (2016-2018)*** 400+ member non-profit organization of top scientists and engineering from all fields of sciences and engineering residing in the state of Connecticut. Members are selected yearly based on their accomplishments in academia, industry and government.
- ***University of Connecticut: Department Head, Mechanical Engineering Department (2006 – 2015)*** All aspects of department management in academic, fiscal and administrative areas. Department currently consists of 26 tenured and tenure-track faculty, 3 faculty-in residence, 3 affiliated faculty, 6 staff members.
- ***University of Connecticut: Chair, ME Department Thermo-fluids faculty (1999-2006)*** Initiated major changes in the graduate course offerings, restructuring of the thermo-fluids core courses in the M.S. and Ph.D. programs.
- ***University of Connecticut: Member, Research Advisory Council (2013-2017)*** University wide body advising the Vice President of Research on policy issues on research infrastructure and administration.
- ***University of Connecticut: Senate Member (2015 - 2019)***
- ***University of Connecticut: Senate Executive Committee representative to the Board of Trustees (2015 - 2018)***
- ***University of Connecticut: Member, Research Advisory Council (1995 - 1998)*** University wide body advising the Vice Chancellor (currently Vice Provost) for Research and Graduate Education on research administration and allocation of funds from indirect costs. Accomplishments: formulated indirect cost return formulas to faculty generating funds and other university programs; simplified, streamlined and enhanced faculty travel funds administered from Office of Sponsored Programs; enhanced and streamlined the award of doctoral dissertation fellowships
- ***Combustion Institute Eastern States Section: Member of the Executive Committee (1999-present), Treasurer (1999–2007), Vice Chair (2007-2009), Chair (2009-2011)*** As chairman I initiated a more democratic and inclusive process for election of new members to the executive committee. Facilitated establishment of three section awards for Young Investigator award (Irvin Glassman award), Best Paper award (George Markstein award) and Best Student Presentation award (Charlie Fenimore award).
- ***Energy and Environmental research Corporation, Irvine CA: Group leader of fluid mechanics and combustion processes (1982-1986)*** technical direction and financial responsibility of large U.S. EPA and DOE sponsored multi-year, multi million dollar research programs from start to finish. Group consisted of 4 to 5 research engineers, 8 – 10 research specialists and technicians.