Stanford

Mark Godfrey Mungal

Professor of Mechanical Engineering, Emeritus

Bio

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Mechanical Engineering

Publications

PUBLICATIONS

- **Single- and dual-band collection toluene PLIF thermometry in supersonic flows** *EXPERIMENTS IN FLUIDS*
  Miller, V. A., Gamba, M., Mungal, M. G., Hanson, R. K.
  2013; 54 (6)
- **Plasma-assisted stabilization of laminar premixed methane/air flames around the lean flammability limit** *COMBUSTION AND FLAME*
  Bak, M. S., Do, H., Mungal, M. G., Cappelli, M. A.
  2012; 159 (10): 3128-3137
- **The improvement of blowout limit in partially/fully premixed flames with geometrically modified bluffbody bases** *EXPERIMENTS IN FLUIDS*
  Kim, W., Do, H., Mungal, M. G.
  2011; 51 (5): 1315-1328
- **The influence of boundary layers on supersonic inlet flow unstart induced by mass injection** *EXPERIMENTS IN FLUIDS*
  Do, H., Im, S., Mungal, M. G., Cappelli, M. A.
  2011; 51 (3): 679-691
- **Visualizing supersonic inlet duct unstart using planar laser Rayleigh scattering** *EXPERIMENTS IN FLUIDS*
  Do, H., Im, S., Mungal, M. G., Cappelli, M. A.
  2011; 50 (6): 1651-1657
- **DAMKOHLER NUMBER SIMILARITY FOR STATIC FLAME STABILITY IN GASEOUS-FUELED AUGMENTOR FLOWS** *COMBUSTION SCIENCE AND TECHNOLOGY*
  El-Asrag, H. A., Pitsch, H., Kim, W., Do, H., Mungal, M. G.
  2011; 183 (7): 718-737
- **Plasma assisted flame ignition of supersonic flows over a flat wall** *COMBUSTION AND FLAME*
  Do, H., Im, S., Cappelli, M. A., Mungal, M. G.
  2010; 157 (12): 2298-2305
- **Plasma assisted cavity flame ignition in supersonic flows** *COMBUSTION AND FLAME*
  Do, H., Cappelli, M. A., Mungal, M. G.
  2010; 157 (9): 1783-1794
- **Flame liftoff height dependence on geometrically modified bluffbodies in a vitiated flow** *EXPERIMENTS IN FLUIDS*
  Kim, W., Im, S., Do, H., Mungal, M. G.
  2010; 49 (1): 27-41
- **Concentration flux measurements in a polymer drag-reduced turbulent boundary layer** *JOURNAL OF FLUID MECHANICS*
  Somandepalli, V. S., Hou, Y. X., Mungal, M. G.
  2010; 644: 281-319

- **The role of in situ reforming in plasma enhanced ultra lean premixed methane/air flames** *COMBUSTION AND FLAME*
  Kim, W., Mungal, M. G., Cappelli, M. A.
  2010; 157 (2): 374-383
- **A Study of Plasma-Stabilized Diffusion Flames at Elevated Ambient Temperatures** *IEEE TRANSACTIONS ON PLASMA SCIENCE*
  Kim, W., Do, H., Mungal, M. G., Cappelli, M. A.
  2008; 36 (6): 2898-2904
- **Jet Flame Ignition in a Supersonic Crossflow Using a Pulsed Nonequilibrium Plasma Discharge** *IEEE TRANSACTIONS ON PLASMA SCIENCE*
  Do, H., Mungal, M. G., Cappelli, M. A.
  2008; 36 (6): 2918-2923
- **Optimal discharge placement in plasma-assisted combustion of a methane jet in cross flow** *COMBUSTION AND FLAME*
  Kim, W., Do, H., Mungal, M. G., Cappelli, M. A.
  2008; 153 (4): 603-615
- **Streamwise development of turbulent boundary-layer drag reduction with polymer injection** *JOURNAL OF FLUID MECHANICS*
  Hou, Y. X., Somandepalli, V. S., Mungal, M. G.
  2008; 597: 31-66
- **Cross-talk in multiple dielectric barrier discharge actuators** *APPLIED PHYSICS LETTERS*
  Do, H., Kim, W., Cappelli, M. A., Mungal, M. G.
  2008; 92 (7)
- **Formation and role of cool flames in plasma-assisted premixed combustion** *APPLIED PHYSICS LETTERS*
  Kim, W., Mungal, M. G., Cappelli, M. A.
  2008; 92 (5)
- **Mechanics and prediction of turbulent drag reduction with polymer additives** *ANNUAL REVIEW OF FLUID MECHANICS*
  White, C. M., Mungal, M. G.
  2008; 40: 235-256
- **On the role of oxygen in dielectric barrier discharge actuation of aerodynamic flows** *APPLIED PHYSICS LETTERS*
  Kim, W., Do, H., Mungal, M. G., Cappelli, M. A.
  2007; 91 (18)
- **Turbulent boundary layer drag reduction with polymer injection** *11th EUROMECH European Turbulence Conference*
  Hou, Y. X., Somandepalli, V. S., Mungal, M. G.
  SPRINGER-VERLAG BERLIN.2007: 38–40
- **Investigation of NO production and flame structure in plasma enhanced premixed combustion** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
  Kim, W., Do, H., Mungal, M. G., Cappelli, M. A.
  2007; 31: 3319-3326
- **Plasma-discharge stabilization of jet diffusion flames** *IEEE TRANSACTIONS ON PLASMA SCIENCE*
  Kim, W., Do, H., Mungal, M. G., Cappelli, M. A.
  2006; 34 (6): 2545-2551
- **Aerodynamic modification of flow over bluff objects by plasma actuation** *EXPERIMENTS IN FLUIDS*
  Sung, Y., Kim, W., Mungal, M. G., Cappelli, M. A.
  2006; 41 (3): 479-486
- **A technique to determine total shear stress and polymer stress profiles in drag reduced boundary layer flows** *EXPERIMENTS IN FLUIDS*
  Hou, Y. X., Somandepalli, V. S., Mungal, M. G.
  2006; 40 (4): 589-600
- **Time evolution and mixing characteristics of hydrogen and ethylene transverse jets in supersonic crossflows** *PHYSICS OF FLUIDS*
  Ben-Yakar, A., Mungal, M. G., Hanson, R. K.

2006; 18 (2)

- **Experimental investigation of stabilization mechanisms in turbulent, lifted jet diffusion flames** *COMBUSTION AND FLAME*
  Su, L. K., Sun, O. S., Mungal, M. G.
  2006; 144 (3): 494-512
- **An experimental and numerical investigation of drag reduction in a turbulent boundary layer using a rigid rodlike polymer** *PHYSICS OF FLUIDS*
  Paschkewitz, J. S., Dimitropoulos, C. D., Hou, Y. X., Somandepalli, V. S., Mungal, M. G., Shaqfeh, E. S., Moin, P.
  2005; 17 (8)
- **Velocity fields in mixing-enhanced compressible shear layers** *JOURNAL OF FLUID MECHANICS*
  Watanabe, S., Mungal, M. G.
  2005; 522: 141-177
- **Determination of total shear stress and polymer stress profiles in drag reduced boundary layer flows with polymer injection** *ASME Fluids Engineering Division Summer Meeting*
  Hou, Y. X., Somandepalli, V. S., Mungal, M. G.
  AMER SOC MECHANICAL ENGINEERS.2005: 23–32
- **Mixing efficiency measurements using a modified cold chemistry technique** *EXPERIMENTS IN FLUIDS*
  Rossmann, T., Mungal, M. G., Hanson, R. K.
  2004; 37 (4): 566-576
- **Simultaneous measurements of scalar and velocity field evolution in turbulent crossflowing jets** *JOURNAL OF FLUID MECHANICS*
  Su, L. K., Mungal, M. G.
  2004; 513: 1-45
- **A laser induced cavitation pump** *JOURNAL OF MICROMECHANICS AND MICROENGINEERING*
  Wang, G. R., Santiago, J. G., Mungal, M. G., Young, B., Papademetriou, S.
  2004; 14 (7): 1037-1046
- **The turbulence structure of drag-reduced boundary layer flow** *11th International Symposium on Applications of Laser Techniques to Fluid Mechanics*
  White, C. M., Somandepalli, V. S., Mungal, M. G.
  SPRINGER.2004: 62–69
- **Nitric-oxide planar laser-induced fluorescence applied to low-pressure hypersonic flow fields for the imaging of mixture fraction** *APPLIED OPTICS*
  Rossmann, T., Mungal, M. G., Hanson, R. K.
  2003; 42 (33): 6682-6695
- **Simultaneous measurements of velocity and CH, distribution. Part II: deflected jet flames** *COMBUSTION AND FLAME*
  Han, D., Mungal, M. G.
  2003; 133 (1-2): 1-17
- **Simultaneous measurements of velocity and CH distributions. Part 1: jet flames in co-flow** *COMBUSTION AND FLAME*
  Han, D., Mungal, M. G.
  2003; 132 (3): 565-590
- **Jets in crossflow - Scalar mixing via PLIF** *Advanced School on Manipulation and Control of Transverse Jets*
  Mungal, M. G., Smith, S. H.
  SPRINGER-VERLAG WIEN.2003: 15–24
- **Jets in crossflow - NOX control using the Two-Stage Lagrangian model** *Advanced School on Manipulation and Control of Transverse Jets*
  Mungal, M. G., Han, D. H.
  SPRINGER-VERLAG WIEN.2003: 183–92
- **Jets in crossflow - Effects of heat release** *Advanced School on Manipulation and Control of Transverse Jets*
  Mungal, M. G., Hasselbrink, E. F.
  SPRINGER-VERLAG WIEN.2003: 173–82

- **Jets in crossflow - Simultaneous PIV/PLIF measurements** *Advanced School on Manipulation and Control of Transverse Jets*
  Mungal, M. G., Su, L. K.
  SPRINGER-VERLAG WIEN.2003: 39–48
- **Evolution and growth of large-scale structures in high compressibility mixing layers** *JOURNAL OF TURBULENCE*
  Rossmann, T., Mungal, M. G., Hanson, R. K.
  2002; 3
- **Stabilization in turbulent lifted deflected-jet flames** *29th International Combustion Symposium*
  Han, D. H., Mungal, M. G.
  ELSEVIER SCIENCE INC.2002: 1889–1895
- **Reply to H. Eickhoff's comment on "Direct measurement of entrainment in reacting/non-Rreacting turbulent jets"** *COMBUSTION AND FLAME*
  Han, D., Mungal, M. G.
  2002; 128 (1-2): 198-198
- **Transverse jets and jet flames. Part 1. Scaling laws for strong transverse jets** *JOURNAL OF FLUID MECHANICS*
  Hasselbrink, E. F., Mungal, M. G.
  2001; 443: 1-25
- **Transverse jets and jet flames. Part 2. Velocity and OH field imaging** *JOURNAL OF FLUID MECHANICS*
  Hasselbrink, E. F., Mungal, M. G.
  2001; 443: 27-68
- **Effects of heat release and buoyancy on flow structure and entrainment in turbulent nonpremixed flames** *COMBUSTION AND FLAME*
  Muniz, L., Mungal, M. G.
  2001; 126 (1-2): 1402-1420
- **Planar velocity measurements in compressible mixing layers** *JOURNAL OF FLUID MECHANICS*
  Urban, W. D., Mungal, M. G.
  2001; 431: 189-222
- **Direct measurement of entrainment in reacting/nonreacting turbulent jets** *COMBUSTION AND FLAME*
  Han, D. H., Mungal, M. G.
  2001; 124 (3): 370-386
- **Gross-entrainment behavior of turbulent jets injected obliquely into a uniform crossflow** *AIAA JOURNAL*
  Han, D. H., Orozco, V., Mungal, M. G.
  2000; 38 (9): 1643-1649
- **Electroosmotic capillary flow with nonuniform zeta potential** *ANALYTICAL CHEMISTRY*
  Herr, A. E., Molho, J. I., Santiago, J. G., Mungal, M. G., Kenny, T. W., Garguilo, M. G.
  2000; 72 (5): 1053-1057
- **Observations on the transition from flame liftoff to flame blowout** *28th International Symposium on Combustion*
  Han, D., Mungal, M. G.
  ELSEVIER SCIENCE INC.2000: 537–543
- **Measurements of velocity and fuel concentration in the stabilization region of lifted jet diffusion flames** *28th International Symposium on Combustion*
  Su, L. K., Han, D. H., Mungal, M. G.
  ELSEVIER SCIENCE INC.2000: 327–334
- **Simultaneous measurement of velocity and CH layer distribution in turbulent non-premixed flames** *28th International Symposium on Combustion*
  Han, D. H., Mungal, M. G.
  ELSEVIER SCIENCE INC.2000: 261–267
- **Prediction of NOx control by basic and advanced gas reburning using the Two-Stage Lagrangian model** *COMBUSTION AND FLAME*

Han, D. H., Mungal, M. G., Zamansky, V. M., Tyson, T. J.
1999; 119 (4): 483-493

- **Mixing enhancement in compressible shear layers via sub-boundary layer disturbances** *PHYSICS OF FLUIDS*
  Island, T. C., Urban, W. D., Mungal, M. G.
  1998; 10 (4): 1008-1020
- **Mixing, structure and scaling of the jet in crossflow** *JOURNAL OF FLUID MECHANICS*
  Smith, S. H., Mungal, M. G.
  1998; 357: 83-122
- **An experimental investigation of the effects of compressibility on a turbulent reacting mixing layer** *JOURNAL OF FLUID MECHANICS*
  Miller, M. F., Bowman, C. T., Mungal, M. G.
  1998; 356: 25-64
- **Observations on the stabilization region of lifted non-premixed methane transverse jet flames** *27th International Symposium on Combustion*
  Hasselbrink, E. F., Mungal, M. G.
  COMBUSTION INSTITUTE.1998: 1167–1173
- **Characteristics of the velocity field near the instantaneous base of lifted non-premixed turbulent jet flames** *27th International Symposium on Combustion*
  Hasselbrink, E. F., Mungal, M. G.
  COMBUSTION INSTITUTE.1998: 867–873
- **PLIF measurements in aqueous flows using the Nd:YAG laser** *EXPERIMENTS IN FLUIDS*
  KARASSO, P. S., Mungal, M. G.
  1997; 23 (5): 382-387
- **Instantaneous flame-stabilization velocities in lifted-jet diffusion flames** *COMBUSTION AND FLAME*
  Muniz, L., Mungal, M. G.
  1997; 111 (1-2): 16-31
- **Mixing and reaction in curved liquid shear layers** *JOURNAL OF FLUID MECHANICS*
  KARASSO, P. S., Mungal, M. G.
  1997; 334: 381-409
- **The structure of OH fields in high Reynolds number turbulent jet diffusion flames** *COMBUSTION SCIENCE AND TECHNOLOGY*
  Clemens, N. T., Paul, P. H., Mungal, M. G.
  1997; 129 (1-6): 165-184
- **Scalar mixing and reaction in plane liquid shear layers** *JOURNAL OF FLUID MECHANICS*
  KARASSO, P. S., Mungal, M. G.
  1996; 323: 23-63
- **Some observations of a large, burning jet in crossflow** *EXPERIMENTS IN FLUIDS*
  Mungal, M. G., Lozano, A.
  1996; 21 (4): 264-267
- **Instantaneous three-dimensional flow visualization of a supersonic mixing layer** *EXPERIMENTS IN FLUIDS*
  Island, T. C., PATRIE, B. J., Mungal, M. G., Hanson, R. K.
  1996; 20 (4): 249-256
- **Curvature effects on mixing and reaction in turbulent shear layers** *3rd International Symposium on Engineering Turbulence Modelling and Measurements*
  KARASSO, P. S., Mungal, M. G.
  ELSEVIER SCIENCE BV.1996: 521–530
- **LARGE-SCALE STRUCTURE AND ENTRAINMENT IN THE SUPERSONIC MIXING LAYER** *JOURNAL OF FLUID MECHANICS*
  Clemens, N. T., Mungal, M. G.
  1995; 284: 171-216

- **Instantaneous velocity measurements in laminar and turbulent premixed flames using on-line PIV** *COMBUSTION SCIENCE AND TECHNOLOGY*
  Mungal, M. G., Lourenco, L. M., Krothapalli, A.
  1995; 106 (4-6): 239-265
- **INSTANTANEOUS 3-DIMENSIONAL CONCENTRATION MEASUREMENTS IN THE SELF-SIMILAR REGION OF A ROUND HIGH-SCHMIDT-NUMBER JET** *JOURNAL OF FLUID MECHANICS*
  Yoda, M., Hesselink, L., Mungal, M. G.
  1994; 279: 313-350
- **DRAG AND WAKE MODIFICATION OF AXISYMMETRICAL BLUFF-BODIES USING COANDA BLOWING** *JOURNAL OF AIRCRAFT*
  Freund, J. B., Mungal, M. G.
  1994; 31 (3): 572-578
- **EXPERIMENTS ON THE STRUCTURE OF AN ANNULAR COMPRESSIBLE REACTING SHEAR-LAYER** *AIAA JOURNAL*
  Barlow, R. S., Fourguette, D. C., Mungal, M. G., Dibble, R. W.
  1992; 30 (9): 2244-2251
- **THE EVOLUTION AND NATURE OF LARGE-SCALE STRUCTURES IN THE TURBULENT JET** *PHYSICS OF FLUIDS A-FLUID DYNAMICS*
  Yoda, M., Hesselink, L., Mungal, M. G.
  1992; 4 (4): 803-811
- **2-DIMENSIONAL AND 3-DIMENSIONAL EFFECTS IN THE SUPERSONIC MIXING LAYER** *AIAA JOURNAL*
  Clemens, N. T., Mungal, M. G.
  1992; 30 (4): 973-981
- **A STUDY OF THE LAMINAR FLAME TIP AND IMPLICATIONS FOR PREMIXED TURBULENT COMBUSTION** *COMBUSTION SCIENCE AND TECHNOLOGY*
  Poinsot, T., Echekki, T., Mungal, M. G.
  1992; 81 (1-3): 45-73
- **LARGE-SCALE DYNAMICS IN HIGH REYNOLDS-NUMBER JETS AND JET FLAMES** *EXPERIMENTS IN FLUIDS*
  Mungal, M. G., Lozano, A., VANCRUYNINGEN, I.
  1992; 12 (3): 141-150
- **TIME EVOLUTION OF THE SHEAR-LAYER OF A SUPERSONIC AXISYMMETRICAL JET** *AIAA JOURNAL*
  Fourguette, D. C., Mungal, M. G., Dibble, R. W.
  1991; 29 (7): 1123-1130
- **LARGE-SCALE STRUCTURES AND MOLECULAR MIXING** *INTERNATIONAL SYMP ON FLUID MECHANICS OF STIRRING AND MIXING*
  Broadwell, J. E., Mungal, M. G.
  AMER INST PHYSICS.1991: 1193–1206
- **A PLANAR MIE SCATTERING TECHNIQUE FOR VISUALIZING SUPERSONIC MIXING FLOWS** *EXPERIMENTS IN FLUIDS*
  Clemens, N. T., Mungal, M. G.
  1991; 11 (2-3): 175-185
- **THE VISIBLE STRUCTURE OF TURBULENT JET DIFFUSION FLAMES - LARGE-SCALE ORGANIZATION AND FLAME TIP OSCILLATION** *COMBUSTION SCIENCE AND TECHNOLOGY*
  Mungal, M. G., KARASSO, P. S., Lozano, A.
  1991; 76 (4-6): 165-185
- **PASSIVE SCALAR TAGGING FOR THE STUDY OF COHERENT STRUCTURES IN THE PLANE MIXING LAYER** *PHYSICS OF FLUIDS A-FLUID DYNAMICS*
  Ramaprian, B. R., Sandham, N. D., Mungal, M. G., Reynolds, W. C.
  1989; 1 (12): 2034-2041
- **VISUAL OBSERVATIONS OF A TURBULENT-DIFFUSION FLAME** *COMBUSTION AND FLAME*
  Mungal, M. G., ONEIL, J. M.
  1989; 78 (3-4): 377-389

- **ORGANIZED MOTION IN A VERY HIGH REYNOLDS-NUMBER JET** *PHYSICS OF FLUIDS A-FLUID DYNAMICS*
  Mungal, M. G., Hollingsworth, D. K.
  1989; 1 (10): 1615-1623