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.

• Reply to H. Eickhoff's comment on "Direct measurement of entrainment in reacting/non-reacting 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.

• 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.

• 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., O'Neil, 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