Micro fluidic and Sensors Laboratory

Lab Incharge: Dr. P.K.Panigrahi

1. General

Name of the lab	Microfluidic and Sensors Laboratory
Location	NL-202
Phone number	7709

2. Research areas

Sl no	Research areas
1	Holography
2	Particle Image Velocimetry
3	Laser induced Fluorescence
4	Laser Schlieren
5	Color Schlieren
6	Liquid Crystal Thermography
7	Interferometry

3. Facililities in the lab(equipments/workstations etc)

Sl no	Name of equipment/workstation/software etc	Quantity
1	Inverted microscope (L E I C A)	1
2	PCO SENSICAM PTV (HAMAMATSU , oxford lasers)	4
3	Color Camera (Sony , Basler)	2
4	High Speed BW Camera (MC1302, *Mikrotron*)	1
5	BW Camera (sony)	2
6	He Ne (research electro-optics , oxford lasers)	4
7	Nd YAG (oxford lasers)	1
SOFTWARES		
1	Dynamic Studio 1.45 (DANTEC Dynamics)	
2	Vid PIV (Oxford Lasers)	

4. Ongoing projects

Sl	Ongoing project name

no	
1	Synthetic jet for Propulsion and Maneuvering of Under-Water Vehicles
2	Micro-devices for Process Applicationss
3	Optical Visualization of Protein Crystal growth
4	Holographic PIV Development for Bio-medical and MEMS Applications
5	Experiments in active control of bluff body drag using a schlieren velocimetry technique
6	Computational and experimental investigations of gaseous mixing in a tubular reactor

5. Completed projects(You may not mention all, but please mention the most significant ones with dates) –

Sl no	Completed project name	Start date	Completion date
1	Flow control for heat transfer enhancement using Liquid Crystal Thermography	1999	2002
2	Laser schlieren technique for characterization of wakes of strongly heated bodies & combustion systems	2000	2003
3	Active flow control by dynamic obstacles in propulsion Applications	2003	2006
4	Rainbow schlieren tomographic measurements during combustion of alternative gaseous fuels such as hydrogen	2003	2006
5	Intelligent control of complex environmental systems using soft computing	2002	2005

6. 10 most significant of the recent publications –

Sl no	Paper title	Journal name and issue
1	Improved digital holographic reconstruction algorithm for depth error reduction and elimination of out-of-focus particles Dhananjay Kumar Singh and P. K. Panigrahi	February 2010 / Vol. 18, No. 3 / OPTICS EXPRESS
2	Color schlieren deflectometry for characterization of crystal growth processes: KDP and lysozyme Anamika SethiaGupta a, P.K.Panigrahi a,n, K.Muralidhar a, RajiveGupta	Journal of Crystal Growth 312 (2010) 817–830, Dec2009.
3	Bordoloi Ankur, Panigrahi P. K. Buoyancy dominated He-O_2 Separated jet mixing in tubular reactor"	*ASME Journal of Fluids Engineering*, **091203-2 /** Vol. 130, SEPTEMBER 2008
4	Dutta S., Panigrahi P. K. and Muralidhar, K. "Experimental investigation of flow past a square cylinder at an angle of incidence"	*ASCE Journal of Engineering Mechanics*,, Vol. 134, No. 9,September 1, 2008
5	Panigrahi P. K., Schroeder A., and Kompenhans J. "Turbulent structures and budgets behind permeable ribs"	*Experimental Thermal and Fluid Science*, 32, 1011-1033, (2008).

6	Singh, S.K., Panigrahi, P K and Muralidhar K "Effect of buoyancy on the wakes of circular and square cylinders: a Schlieren-Interferometric study"	*Experiments in Fluids*, Vol. 43, No. 1, pp. 101-123 (2007)
7	Srivastava, Atul, Muralidhar K and Panigrahi, P K "Measurement of three-dimensional concentration gradients around a crystal growing from its aqueous solution using laser schlieren"	*Crystal Research and Technology*, Vol. 42, No. 8, 778-790 (2007)
8	Dutta, S, Panigrahi P K and Muralidhar, K "Sensitivity of a square cylinder wake to forced oscillations"	*ASME Journal of Fluids Engineering*, Vol. 129, pp. 852-870 (2007).
9	Pandey, Praveen, Pundir, B. P. and Panigrahi, P. K. "Hydrogen addition to acetylene-air laminar diffusion flames: studies on soot formation under different flow arrangements"	*Combustion and Flame*, Volume 148, Issue 4, pp. 249-262 (2007).
10	Panigrahi, P. K. , Schroeder, A., and Kompenhans, J. "PIV investigation of flow behind surface mounted permeable ribs"	*Experiments in Fluids* , Vol.40, pp. 277-300 (2005).
11	Srivastava, A., Muralidhar, K., and Panigrahi, P. K. "Reconstruction of the concentration field around a growing KDP crystal using schlieren tomography"	*Applied Optics*, Vol. 44, N0. 26, pp. 5381-5392 (2005).
12	Srivastava, A., Muralidhar, K., and Panigrahi, P. K. "A schlieren study of the effect of ramp rate and rotation on convection around a crystal growing from an aqueous solution",	*Journal of Crystal Growth*, Vol. 274, Issue 1-2, pp. 191-208 (2005).
13	Tiwari, S., Chakraborty, D., Biswas, G. and Panigrahi, P. K. "Numerical prediction of flow and heat transfer in a channel in the presence of a built-in circular tube with and without an integral wake splitter"	*International Journal of Heat and Mass Transfer*, 48, pp. 439-453 (2005).
14	Panigrahi, P. K. and Acharya, S., "Excited turbulent flow behind a square rib"	*Journal of Fluids and Structures*, 20(2) pp. 235-253 (2004)
15	Panigrahi, P. K., Schroeder A. and Kompenhans, J."Wavelet investigation of coherent structures behind permeable rib"	*WSEAS Transactions on Systems*, 10(3), 3104-3107 (2004).
16	Tariq, A., Panigrahi, P. K. and Muralidhar, K., "Flow and heat	*Experiments in Fluids*, 37, pp.701-719 (2004).

	transfer in the wake of a surface-mounted rib with a slit”	