SANTANU PAUL

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CAREER OBJECTIVES

Contribute towards manufacturing ecosystems by developing sustainable and innovative solutions using my technical expertise in Non-linear FEA and material characterization

AREAS OF EXPERTISE

- Non-linear finite element analysis
- Metallurgical and thermomechanical processing of materials
- Laser based material processing

SKILLS

Numerical analysis:
- ABAQUS CAE and User subroutines;
- DANTE Heat Treatment Simulation software;
- ANSYS-FLUENT;
- SOLIDWORKS

Programming skills:
- FORTRAN 95;
- C/C++;
- MATLAB 2012b;
- Wolfram Mathematica 7

Statistical analysis:
- OriginLab;
- Minitab;
- TSL-OIM™
- EBSD Software AZtecHKL

Experimental skills:
- Fiber laser optics; Alicona 3-D Surface profilometer; White Light Interferometer;
- Micro-focus XRD and Neutron diffraction;
- SEM; Nano-indentation;
- 4-D X-ray tomography system

EDUCATION

Degree	Alma mater	Year	CPI/%
Doctor of Philosophy	IIT Bombay and Monash University, Australia Specialization: Manufacturing	Expected in 2017	8.63
Master of Technology	IIT Delhi Specialization: Thermal Engineering	Aug. 2012	7.355
Bachelor of Technology	NIT Surat Specialization: Mechanical Engineering	May 2009	7.9
Intermediate/+2	Assam Higher Secondary Educational Council	March 2004	76.6%
Matriculation	Board of Secondary Education, Assam	March 2002	78.83%

AWARDS and RECOGNITIONS

Recipient of the prestigious "***NAMRI/SME Outstanding Paper Award***" at NAMRC-44

ACADEMIC ACHIEVEMENTS

(1) Achieved above 99.9 percentile among ~60000 candidates in Mechanical Engineering paper in the most competitive Graduate Aptitude Test in Engineering (GATE 2010)
(2) Ranked in the top 1% among ~0.4 million candidates in the prestigious All India Engineering Entrance Examination (AIEEE), 2005

RESEARCH PROJECTS

Ph.D. project:	Laser surface cladding for structural repair
Advisors:	Prof. Ramesh Singh (IIT B) and Prof Wenyi Yan (Monash University)
Research objectives:	✓ Thermal model for laser cladding for prediction of clad geometry ✓ Mechanical and Metallurgical characterization ✓ Coupled metallo-thermomechanical model of laser cladding ✓ Process maps for optimal cladding conditions
Research tools:	➢ ABAQUS CAE and User subroutines (FORTRAN 95); ➢ Matlab 2012b and Mathematica; ➢ Micro-focus X-ray diffraction and Neutron diffraction analysis; ➢ SEM and EBSD analysis ➢ Dynamic thermomechanical testing in Gleeble

M.Tech Project:	Film cooling of corrugated liner of after burner for aero engines
Advisors:	Prof. B Premachandran and Prof. M R Ravi (IIT Delhi)
Research objectives:	✓ Developed experimental set up for film heating based on similitude analysis ✓ Parametric studies based on mainstream Reynolds Numbers and Blowing ratios
Research tools:	➢ Structural and thermal analysis using ANSYS/FLUENT ➢ Design development using SOLIDWORKS ➢ Experimental setup fabrication

B. Tech Project:	Numerical simulation of gas turbine combustion chamber
Advisors:	Prof R D Shah (NIT Surat)
Research objectives:	✓ Aerodynamic and thermal field characterization of Wall Jet Can Combustor
Research tools:	➢ Thermal analysis using ANSYS/FLUENT

RESEARCH EXPERIENCE

Project title:	Flexible Reconfigurable Fiber Laser Systems for Micro-Scale Materials Processing
Period:	Oct 2012- Jan 2013
Employer:	Indian Institute of Technology Bombay, Mumbai-400076, India
Achievements:	✓ Design optical setup for fiber laser system ✓ Parametric studies for Micro-Scale Material Processing

ACADEMIC EXPERIENCE

Teaching Assistant at IIT Bombay [2013-Present]
Course: Laser Material Processing; Manufacturing Process – II; Metrology and Heat Transfer Lab

- ❖ Involved in the development of new material for the course
- ❖ Delivered a range of lectures and assessment activities including examinations and tutorials
- ❖ Provided guidance to participants on course projects

Teaching Assistant at IIT Delhi [2011-12]
Course: Advanced Thermodynamics

- ❖ Supervised practical work advising on skills methods and techniques
- ❖ Assessment of examinations and tutorials

Mentoring of students

- ❖ IIT Bombay: 2 Master students [July'13-Dec'14] and 1 PhD student [Jan'17-Present] 1 Master student [Jan'16-Present]
- ❖ Monash University: 1 Master student [Jan'15-Oct'15]

PUBLICATIONS

International Journals

1. **Paul, S**., Gupta, I., Singh, R., Characterization and modeling of micro-scale pre-placed powder cladding via fiber laser, DOI: 10.1115/1.4029922
2. **Paul S**., Singh R., Yan W., Thermal model for additive repair of mold steels using crucible steel, http://dx.doi.org/10.1016/j.jmapro.2016.06.012
3. Kattire P., **Paul S**., Singh R., Yan W, Experimental characterization of laser cladding of CPM 9V on H13 tool steel for die repair applications, DOI: 10.1016/j.jmapro.2015.06.018
4. Gupta N, Bhimrao S, **Paul S**, Singh R, Modeling of micro-scale fiber laser hardening process and optimization via statistical approximation of the engineering models, DOI:10.1007/s12541-015-0293-9

Book Chapters

1. **Paul S**., Singh R., Yan W., Finite element simulation of laser cladding for tool steel repair, Lasers based Manufacturing, Springer 2015; ISBN: 978-81-322-2352-8 (Online)
2. Singh R., Shrivastava A., **Paul S**., Laser Welding, Laser Hardening and Laser Surface Modification; Engineering Applications of Lasers; CRC Press (In Progress)

International Conferences

1. Characterization of micro scale pre-placed powder cladding via fibre laser, COPEN-8, Calicut
2. Residual stress modeling of powder injection laser surface cladding for die repair applications, MSEC 2014, Detroit, Michigan, USA
3. Thermo-mechanical modeling of laser cladding of CPM 9V on H13 tool steel, AIMTDR 2014, Guwahati, India
4. Metallo-thermo-mechanical modeling of laser cladding for additive restoration of die steels using crucible steels, ICCM2016, Berkeley, CA, USA
5. Experimental characterization of clad microstructure and its correlation with residual stresses, NAMRC-45, Los Angeles, USA

RELEVANT COURSEWORK

Ph. D:	➢ Fracture Mechanics	➢ Laser Materials Processing
M. Tech:	➢ Advanced Thermodynamics	➢ Viscous Fluid Flows
	➢ Convection Heat and Mass Transfer	➢ Finite Element Method
	➢ Radiation and Conduction Heat Transfer	➢ Applied Mathematics
Certification:	➢ Programming in C	➢ Data structures

EXTRA-CIRICULAR ACTIVITIES

- ❖ Volunteer at **"COPEN-9"** held at IIT Bombay [Dec. 2015]
- ❖ Participated in Industry Defined Problems in" **Mindbend '08**" at NIT Surat
- ❖ Executive Member of "**UDGHOSH-2005**" organized by The Institute of Engineers (India)

REFERENCES

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