CV of Vivek Bajpai

Address: **Vivek Bajpai, PhD**
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CURRENT POSITION

Assistant Professor at Indian Institute of Technology (ISM) Dhanbad formally known as Indian School of Mines Dhanbad, Jharkhand, India (Joining date: 27/8/2015)

EDUCATION

Doctor of Philosophy in Mechanical Engineering ***January 2013***
Indian Institute of Technology Bombay, Powai, Mumbai
- Major: Manufacturing Processes (Micromachining)
- Advisor: Dr. Ramesh K. Singh
- Ph.D. Dissertation Title: *Characterization and Modeling of Pyrolytic Carbon Micromachining for Creation of Engineered Features*

Master of Engineering in Production Engineering ***June 2008***
Shri G.S. Inst. of Tech & Sc., Indore (MP)
- Major: Manufacturing Processes (Metal casting)
- Advisors: Dr. Durgesh Joshi
- M.E. Thesis Title: *Feeder Design and Analysis using Transient Thermal Analysis for Sand Casting*

Bachelor of Engineering in Mechanical Engineering ***June 2006***
Govt. Engineering Collage, Rewa, India
- Major Project: Track patrol (It was a two wheeler that was able to run on monorail at V_{max}=50 km/h)
- Minor Project: Water based air cooling system for long distance passenger buses

RESEARCH EXPERIENCE

Research at ISM Dhanbad (Aug. 15- Current date)
- *Development of cryogenic micromachining setup*
- *Development of high speed micro machining center*
- *Air gap modeling in metal casting*
- *Cutting force prediction at micro featured rake face in orthogonal machining*
- *Development of burr minimization techniques in super alloys*

MTech completed: 16
MTech ongoing: 02

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Detail of PhD Ongoing

Sr. No.	Name of the student	Date of Joining	Title	Remark
1.	Mohan Kumar	01/08/2016	*Development of burr minimization techniques in micromachining for difficult-to-machine metals*	2 papers, one paper under review
2.	Rachit Ranjan	17/03/2017	Development of high performance metal matrix nano-composites for space applications	One conference paper
3.	Ankit Jain	02/08/2017	Creation of engineered features on titanium alloys and their functional characterization for clinical application	One Book chapter Two SCI papers One under review
4.	Deepak Kumar	02/08/2017	Technology development for high precision micro/nano EDM	Prof. NK Singh is Co-Guide
5.	Shashank Shukla	2/8/2017	Improvement in machinability of titanium alloys	One book chapter accepted "Cryogenic machining"
6.	Ravi Shankar Rai	---	Development of high performance Nano wire based carbon fibre composite material	
7.	Arnab Das	01/08/2018	Diamond turning of hard/brittle materials	Started

PhD completed: Zero

Research at MEC Hyderabad (April 2014- Aug. 15)

Machining of Ti54 alloy at different heat treated conditions

- *Experimental work for cutting forces and tool temperature of Ti54 (with Prof. Navneet Khanna at IITRAM, Gujrat)*
- *Process simulation of machining on Abaqus® (Explicit)*

Research at UNIST, Ulsan (April 2013-March 2014):

Milling of Ti6Al4V:

- *Process modeling via FEM codes, thermal and stress coupled analysis*
- *Cutting forces and chip morphology*

Tool life improvement via cryogenic machining of super alloys

- *100% improved tool life via cryo-cooled machining and still improving with the help of workpiece preheating*

Hard turning:

- *Patterning of the CBN tool and application in reduction of cutting forces via reduction in the contact area of chip and the tool rake face*

Research at IIT Bombay (July 2008-Feb. 2013):

Micromachining characterization of pyrolytic carbon (PyC)

- Micromachining characterization of PyC to investigate the effect of material anisotropy
- Finite element modeling of progressive material degradation and interlaminar decohesion during orthogonal micromachining of PyC
- Effect of material and thermal anisotropy in micro-EDM of PyC
- Finite element simulation of the effect of thermal anisotropy during Micro-EDM

Creation and functional characterization of engineered surfaces for cell growth/adhesion

- Creation of engineered features via micromilling and micro-EDM process
- Cell growth and cell adhesion analysis on the textured surfaces

Characterization and modeling of burr formation during micromilling

- Evaluation of exit burr size via optical and scanning electron micrographs
- Novel use of white light interferometry for measuring exit burrs
- Development of an analytical model based on plastic hinging for prediction of exit burrs

Ultra-highspeed micromachining center

- Design and fabrication of ultra-highspeed micromachining center (spindle speed upto 160,000 rpm)
- Stability analysis of ultra-highspeed micromachining center via stability-lobes diagram
- Effect of process parameters on the width and depth of the channels and average 3D surface roughness
- Burr characterization at ultra-highspeed micro end mill in Ti6V4Al alloy

Research at SGSITS Indore (2006-2008):

Solidification analysis of metal casting via FE simulation:

- Feeder design and analysis
- Cooling potential of various moulding sands

Research at Rewa Engineering College, Rewa (2002-2006):

Three projects have been performed

- Energy efficient-closed loop-eco-friendly small scale power house (project cost estimation and development of methodology)
- Air cooled passenger bus via air evaporation system (only documentation and theory)
- Track guarding system on MONO rail for rail security and rapid transport (working model)

ACADEMIC/TEACHING EXPERIENCE

Assistant Professor at Indian School of Mines Dhanbad *(Aug. 2015-Current date)*

Courses:

Sr. No.	Course	Code	PG/UG	Number of times	Theory/practical
1.	Manufacturing Processes	MMC11102	UG	1	Theory
2.	Engineering Mechanics	MMC12103	UG	1	Theory
3.	Computer aided Manufacturing	MMC52107	PG	1	Theory
4.	Engineering graphics	MMC11101	UG	2	Practical
5.	Solid Mechanics	MCR13201	UG	1	Practical
6.	Kinematics of machines	MCC13203	UG	1	Practical
7.	Computer aided Manufacturing	MMC18201	UG	1	Practical

Assistant Professor at Mahindra Ecole Centrale Hyderabad *(April 2014 to Aug. 2015)*

Teaching Assistant at IIT Bombay

Machine Tools laboratory, Indian Institute of Technology Bombay, Mumbai, India.
Following courses have been mentored**:**

- ME 643 Manufacturing Process Lab. (PG)

- ME 372 Heat Transfer and Metrology Lab (UG and dual degree)
- ME 374 Manufacturing Processes Lab (UG and dual degree)
- ME 338 Manufacturing process (UG course)
- ME 677 Laser Material Processing (PG course)

Teaching Assistant at Shri G.S. Inst. of Tech & Sc., Indore

- *CAD lab was maintained*
- *Mentor to UG student for Auto-CAD/Pro-E practice*

AWARDS AND RECOGNITIONS:

1. Early carrier research scheme of DST, Govt. of India awarded
2. Faculty research funding at ISM Dhanbad
3. IIT Bombay International travel support to attend ICOMM-2012 at Evanston USA (2012)
4. CSIR International travel support to attend MSEC-2011 at Corvallis USA (2011)
5. Student support for registration and lodging by *National Science Foundation USA* during ICOMM 2010 (2010)
6. DST International travel support to attend ICOMM-2010 at Madison USA (2010)
7. MHRD Scholarship during PhD at IIT Bombay (2008)
8. GATE Scholarship during ME at SGSITS Indore (2006)
9. 1st price in Rural Science Exhibition at district level during HSSC (1998)

OTHERS:

- *Reviewer of*
  - *Materials and manufacturing processes*
  - *Journal of Zhejiang University SCIENCE A*
  - *Journal of Advanced manufacturing systems*
  - *Journal of Mechanical Engineering Science*
  - *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*
  - *Advances in Manufacturing*
- *Member of technical program committee in 2015 International Conference on Materials Processing Technology (MPT-2015), Shanghai, China*

MACHINE OPERATION

CNC machines**
White light interferometer (VEECO WYKO NT9100)***, SEM**, CMM*

COMPUTER EXPERIENCE

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- Operating Systems: Windows*** and Linux/Unix based operating systems*
- Programming Languages: MATLAB**, C++*, JAWA*, Python*
- CAD/CAM: AutoCAD***, Pro/ENGINEER***, Master CAM**
- Finite Element Package: ABAQUS***, ANSYS**, COMSOL**, DEFORM*
- Other Applications: Mathematica*, Minitab**, Photoshop*, ImageJ**

*** EXPERT
** MODERATE
* CAN OPERATE

REFERENCES

- Prof. Ramesh Kumar Singh
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- Dr. Abhijit Bhattacharya
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