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E-mail: mbrijbhushan@gmail.com  
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Website: mbrijbhushan.com
- EDUCATION **Bachelor of Technology - Mechanical Engineering** Aug 2008 - Jul 2012  
Indian Institute of Technology (IIT) Madras, Chennai, Tamil Nadu, India
- Cumulative Grade Point Average (CGPA): **9.54/10**
  - Professional Minor: Operations Research
  - Student Exchange Program for 1 semester at NTU Singapore Jan-May, 2011
- Master of Science in Mechanical Engineering (SMME)** Aug 2015 - Present  
Massachusetts Institute of Technology, Cambridge, MA, United States
- ACADEMIC ACHIEVEMENTS
- Banco foundation prize for the best academic record (Rank: 1<sup>st</sup>) in the Mechanical Engineering 2008 batch (B-Tech & Dual Degree) of 115 students at IIT Madras. **2012**
  - O P Jindal Engineering and Management Scholarship (OPJEMS), awarded to 1 student in every batch for academic and leadership excellence. **2010 & 2011**
  - Todai-IIT undergraduate scholarship for academic excellence. **2010 & 2011**
  - Nominated for the Young Engineers' Visitation Program (YEVP), one among 36 students from all over India, by the Indo-US Science and Technology Forum (IUSSTF) **Jun 2011**
  - Leadership Enrichment and Regional Networking (*LEaRN*) scholarship program which involved a semester of study at NTU Singapore. Was one among 7 students nominated from India and among 52 all over South-East Asia. **Jan-May 2011**
- PUBLICATIONS & CONFERENCES Rao, P.K.; Bhushan, M.B.; Bukkapatnam, S.T.S.; Zhenyu Kong; Byalal, S.; Beyca, O.F.; Fields, A; Komanduri, R., **Process-Machine Interaction (PMI) Modeling and Monitoring of Chemical Mechanical Planarization (CMP) Process Using Wireless Vibration Sensors**, IEEE Trans. on Semiconductor Manufacturing, vol.27, no.1, pp.1, 15-Feb-2014. [doi: 10.1109/TSM.2013.2293095]
- R.Vairamuthu; M.Brij Bhushan; R.Srikanth; N.Ramesh Babu, **Performance Analysis of Cylindrical Grinding Process with a Portable Diagnostic Tool**, All India Manufacturing Technology, Design and Research Conference-AIMTDR 2014  
**Link:** <http://www.iitg.ernet.in/aimtdr2014/PROCEEDINGS/papers/582.pdf>
- Subramanian K, Ananat Jain, Brij M Bhushan, Vairamuthu R, **Tribology as an Enabler for Innovation in Surface Generation Processes**, Proc. Of the ASME 2015 International Mechanical Engineering Congress and Exposition (IMECE 2015), Houston, Texas, 2015; pp.1-11.
- WORK EXPERIENCE **Assistant Manager (R&D)** Aug 2012 - Jul 2015  
*Micromatic Grinding Technologies Limited (MGTL), Bangalore, India*
- Hired through an innovative program for advanced technology development leading to identifiable commercial impact in less than 24 months.
  - Worked on core technology, process know-how, new product development, education and training.
  - Led a team of 4 people for new solution development and knowledge integration.
- Summer Intern** May - Jul 2011  
*ITC Ltd., Guntur, India*
- Accomplished an annual cost saving of ₹ 0.8 million by applying a systems approach of study to analyze the steam and compressed air usage patterns in the plant and suggested improvements based on the best practices in industry.
  - Redesigned the entire compressed air distribution layout to meet the future increase in demand.
- Summer Research Intern** May - Jul 2010  
*Oklahoma State University (OSU), Stillwater, OK, USA*  
Research Topic: Developing a Process-Machine Interaction (PMI) model for vibration in the Chemical Mechanical Planarization (CMP) process.

RESEARCH  
PROJECTS

**Vibration modeling of the CMP process**

May-Jul, 2010

*Guides: Prof. Satish T Bukkapatnam & Prof. Ranga Komanduri*

*Dept. of Mechanical and Aerospace Engg., Oklahoma State University, Stillwater, OK, USA*

- Developed a two-degree of freedom, deterministic, non-linear model in Simulink to capture the physical sources of CMP vibrations to explain various process features observed in practice.
- Conducted experiments on a Buehler grinder-polisher to further develop and verify the model.
- The model is able to explain some characteristic non-linear, dynamic behaviour observed in experimental vibration signals from the CMP process.

**A diagnostic tool for in-process monitoring of grinding**

Jan 2012 - Jul 2015

*Guides: Prof. N Ramesh Babu, Dept. of Mech. Engg., IIT Madras &*

*Dr. K (Subbu) Subramanian, President, STIMS Institute, USA*

- Developed a diagnostic tool to monitor grinding power and axes position.
- Deployed in industry for process diagnostics and optimization, utilized in more than 50 cases.
- Utilized as an educational tool for IMTMA system approach to grinding course. (2012-14)
- Developed a business model of Grinding Process Solutions (GPS), based on the process expertise gained through applications in discrete-part precision grinding in the industry.

**Human Physiome on a Chip**

Aug 2015 - present

*Guides: Prof. David L. Trumper, Dept. of Mech. Engg., MIT*

- Developing hardware used by biology team to grow human tissues showing physiological behavior.
- Current work in in the development of a 7 organs on a chip platform.

INDUSTRIAL  
PROJECTS AT  
MGTL

**CBN Grinding machine development**

Jul 2013 - Jul 2015

- Established CBN grinding machine specifications and potential market segments.
- **Personal Contribution:** Development of cost per component model, Market study, CBN process know-how development, Experimental development of solutions
- **Result:** Development of CBN grinding capability.

**Testing protocol for cylindrical grinding machine**

Oct 2013 - Jul 2015

- Prepared a testing procedure for machine validation based on various ISO standards, inverse machine design and linking the machine tool design to the grinding process.
- **Personal Contribution:** Knowledge integration, Instrumentation, Establishing testing rig
- **Result:** Testing protocols to improve machine quality, consistency and reliability.

**Development of non-round grinding solutions**

Mar 2014 - Jul 2015

- Developed software for non-round grinding and integrating it in the form of a graphical user interface (GUI) with the CNC in a master-slave architecture.
- **Personal Contribution:** Vector based tool path offset generation, Non-round grinding process know-how, GUI development, Motion optimization
- **Result:** Development of non-round grinding capability within the company, resulting in an order worth ₹10 million. Basis for new line of non-round grinding machines.

PROJECT WORK  
(COMPETITIONS)

**DRDO Student Robot Competition, 2010**

Mar-Oct, 2010

*Organizer: Defence Research & Development Organization (DRDO), India*

*Funding: Center for Innovation (CFI), IIT Madras & prize money for prototype development*

- **Problem statement:** Develop an autonomous off road robotic platform to navigate a rough terrain and avoid natural and man made obstacles in the shortest amount of time.
- **Team:** Led an 8 member team of undergraduate students.
- **Personal Contribution:** Mechanical Design, GPS based navigation, and image processing.
- **Result:** Placed among the top 5 teams, out of 240 teams all over the country.

SKILLS

**Programming Languages:** C, C++, Python, Numpy, Scipy, Open CV, CNC (FANUC, Siemens)

**Software applications:** MATLAB, AutoCAD, ProE, Ansys, Autodesk Inventor, Mathematica, L<sup>A</sup>T<sub>E</sub>X, LabVIEW, Solidworks, Simulink, Microsoft Office

**Embedded Systems:** Arduino, AVR (AtMega16, AtMega128), GPS, motor drivers, encoders, magnetic compass, accelerometers, vision systems.

VOLUNTEER  
EXPERIENCE

- Organizing de-stress and meditation sessions with the Art of Living Club at MIT
- Member of iREFS team at MIT - as a confidential peer resource for fellow students during times of uncertainty, stress or conflict.

*For more information, please visit: [mbrijbhushan.com](http://mbrijbhushan.com)*