

# Dr. Abhijit Tanksale

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## Education Details

Degree	Specialization	Institute / University	Year
Doctorate	Design Engineering	IIT Bombay	2024
Post Graduation	Manufacturing Technology	NIT Tiruchirappalli	2013
Graduation	Mechanical Engineering	Solapur University	2010

## Research Interest

Compliant mechanisms, Nonlinear static and dynamic analysis, Micro 3D printing, Optimization and synthesis of mechanisms

## Ph.D. Thesis Project

[July 2014 – Sept 2024]

### Synthesis and Analysis of Folded-Beam Compliant Mechanism for Industrial Applications

*Supervisor: Prof. Prasanna S. Gandhi, Department of Mechanical engineering, IIT Bombay.*

- Formulation and analysis of parallelogram compliant mechanisms with large deformation under the effect of gravity
- Structural optimization and numerical simulations of parallelogram compliant mechanisms
- Proposed and validated a novel resonant-based dynamic displacement amplification mechanism for high-speed applications.
- Nonlinear dynamic analysis of parallelogram compliant mechanisms using a novel mathematical model and its validation through experiments.
- **Applications:** Synthesized ultra-precise motion platforms utilized as motion stages in micromilling and micro 3D printing.

## M.Tech Thesis Project

[July 2012 – June 2013]

### Phase I: Evaluation of Micro-structural and Mechanical properties of friction welding of super duplex stainless steel

*Supervisors: Prof. P. Sathiya, Department of Production engineering, National Institute of Technology, Trichy.*

- Pursued state of the art literature about fusion welding of super duplex stainless steel and studied changes in the mechanical properties as well as on the microstructure at welded joint.
- Characterized Mechanical and microstructural properties of Friction welded joint with various test like tensile test, Impact test, SEM and XRD analysis.

### Phase II: Methodology development for blocker door mechanism using Kinematic Approach

*Supervisors: Prof. P. Sathiya, NIT Trichy and Mr. Bhaskar Ram, Lead Engineer, Aviation Department, GE Bangalore.*

- Evaluated different synthesis methods available in the literature for blocker door mechanism.
- Developed a method to find out the precise link lengths of the blocker door mechanism under design constraints.

## Research Projects

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### Design and Development of novel high-speed, high-resolution, and large-volume 3D micro-printer

[Feb2020- Feb 2023]

*Supervisor: Prof. Prasanna S. Gandhi, Department of Mechanical engineering, IIT Bombay.*

- Wrote proposal of the project under the guidance of supervisor on the basis of PhD thesis work and previous lab work for Science and engineering research board, India.
- Designed and developed compliant-based motion stages with least possible parasitic error for both X and Y axis of 3D printer with large stroke of 75 mm along with teammates.
- Worked on various technical aspects of the project and procured several equipments for the project like actuators, sensors, laser source and laser analysis tools.
- Overall student coordinator for the project: Discussed technical details, goals and ideas with other teammates to progress the project towards completion.

### Development of Technology for Micromilling using compliant motion stages

[Sept 2017 – May 2018]

*Supervisor: Prof. Prasanna S. Gandhi, Department of Mechanical engineering, IIT Bombay*

- Achieved ultra-precise linear motion for X stage by reducing the undesired parasitic error with structural optimization
- Controlled the compliant-based XY stage using the inbuilt PID controller of the Galil board and achieved positioning error of 1.71 microns over 20 mm stroke and cross-axis coupling below 5 microns during cutting operation.
- Fabricated a few microcomponents using NC codes on the in-house flexure based micromilling setup.
- Project won **FIE Foundation Award 2019** for the technology of micromilling developed and licensed to a company Strategi Automation at IMTEX 2019 (Team: Abhijit Tanksale, Ratnesh Bafna and Prof. Prasanna Gandhi).

## Work Experience

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### 1. Assistant Professor

*Fr. Conceicao Rodrigues college of Engineering ,Mumbai, An Autonomous Institute of Affiliated to Mumbai University.*

[June 2025 – Present]

- Teaching **Engineering Graphics** and **CAD/CAM** to a batch of 60 students.
- Conducting **Engineering Graphics** and **Measuring Instruments and Testing tools** practicals to demonstrate and conceptually understand relevant subjects.

### 2. Assistant Professor (Adhoc)

*Virmata Jijabai Technological Institute,Mumbai, An Autonomous Institute of Government Maharashtra.*

[Aug 2024 – June 2025]

- Taught **Mechatronics** and **Measurement & Metrology** to a batch of 80 students.
- Conducted **Mechatronics** and **Measurement & Metrology** laboratory where demonstrated and explained various experiments to students to understand the relevant topics conceptually.

### 3. Assistant Professor

*Sinhgad Institute of Technology, Lonavala, affiliated with Pune University .*

[July 2013 – June 2014]

- Taught **Engineering graphics** and **Basic mechanical engineering** to a batch of 60 students.

- Conducted **Theory of Machine** and **AutoCAD** laboratory where demonstrated and explained various experiments to students to understand the relevant topics conceptually.

## Teaching Assistantship

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- Gained immense advanced knowledge in the following subjects during coursework & teaching assistantship at IIT Bombay.
- Designed assignments, assessed exam papers, conducted tutorials and clarified students' doubts in theory courses assistantship. For Solid Mechanics laboratory demonstrated experiments to the students and explained the physical phenomena in detail to get a conceptual understanding to the students.

**Subjects:**

• Kinematics and dynamics of Machinery	• Stress Analysis
• Mathematical methods for Mechanics & Dynamics	• Machine Design
	• Solid Mechanics Lab

## Extra-Curricular activities and Interest

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- **Exhibitor for Techfest (Techconnect)** held at IIT Bombay to showcase research work carried out at Suman Mashruwala Advance Microengineering Laboratory.
- Participated in National level **Roborace competitions** during under graduation held at various colleges and universities.
- Participated in National level technical **Energy contraption** held at College of Engineering Pune, in the event called "*MindSpark 08*".
- Swimming, Cricket, Trekking, listening to music.

## Technical Skills

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**Programming Languages:** MATLAB, C

**Data acquisition systems:** dSpace, Galilboard

**Softwares:** Simulink, Solidworks, Ansys, Galilsuite, ControlDesk-dSpace, LaTeX

## Patent and Journal publications

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1. **Method and apparatus for high-speed precision motion with resonant displacement amplification**, Indian Patent Application No. 201621034174, Patent No. 502109. **Inventor:** Prof. Prasanna S. Gandhi and **Abhijit Tanksale**
2. **Tanksale Abhijit** and Gandhi Prasanna, "Design and Analysis of Ultra-Precise Large Range Linear Motion Platforms Using Compliant Mechanism" *IEEE Access*, (2022) Vol.10, pp. 94321-94336. [DOI](#)
3. T. Udaykumar, K.Raja, **Tanksale Abhijit** and P. Sathiya, "Experimental investigation on mechanical and metallurgical properties of super duplex stainless steel joints using friction welding process" *Journal of Manufacturing processes*, (2013), Vol.15(4), pp.558 – 571.[DOI](#)

## Conferences: Paper and Poster Presentations

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1. **Abhijit Tanksale** and Prasanna Gandhi, "Large Deformation Analysis and Experiments With Double Parallelogram Compliant Mechanisms", *Proceedings of the ASME 2018 International Mechanical Engineering Congress and Exposition*. Pittsburgh, Pennsylvania, USA 2018. [DOI](#)
2. **Abhijit Tanksale** and Prasanna Gandhi, "'On Novel Dynamic Displacement Amplification Using Compliant Mechanisms.'" *Proceedings of the ASME 2018 International Mechanical Engineering Congress and Exposition*. Pittsburgh, Pennsylvania, USA 2018. [DOI](#)
3. Nilesh Bansod, **Abhijit Tanksale** and Prasanna Gandhi, "On High-Precision Large-Range Resonant-Amplified Scanning with Limited Range Actuation. *Lecture Notes in Mechanical Engineering*. Springer, Singapore. [DOI](#)

4. Ratnesh Bafna, **Abhijit Tanksale** and Prasanna Gandhi, Fabrication of Micro-Compliant Mechanisms Using Micro-Stereolithography. In: *Sen, D., Mohan, S., Ananthasuresh, G. (eds) Mechanism and Machine Science. Lecture Notes in Mechanical Engineering*. Springer, Singapore. [DOI](#)
5. **Abhijit Tanksale**, Ratnesh Bafna and Prasanna Gandhi, “A Futuristic Approach to Micro-Milling With Linear Motion Compliant Mechanism Based Platforms”, *Proceedings of the ASME 2023 International Mechanical Engineering Congress and Exposition*. New Orleans, Louisiana, USA 2023.
6. **Technical Posters presented:** (a) *International conference on Machine and mechanism*, 2017, BARC Mumbai  
(b) *Asian Mechanism and Machine Science* 2018, Indian Institute of Science (IISc), Bengaluru, India.