

**Prasanna Deshmukh**  
Indian Institute of Astrophysics,  
II Block, Koramangala, Bangalore 560034, India.  
pgdeshmukh.iiia@gmail.com, prasanna@iiap.res.in



---

**OBJECTIVE :** To work in tandem with a team in a challenging environment where I could improve my knowledge, capabilities and put them to use to achieve the organizational goals.

---

**SUMMARY :**

- PhD (Thesis Submitted) and Masters of Technology (M.Tech) in Astronomical Instrumentation with demonstrated skills in the field of Electronic Control System, Electromechanical Systems, Electronic System Design, Simulation, and Fabrication, Computer-Aided Design (CAD) and Project Management.
- Multi-disciplinary engineering background with good analytical and problem solving skills.
- Highly organized and efficient in fast-paced multitasking environments; able to effectively coordinate tasks to accomplish projects with timeliness and creativity.
- Ability to interact and effectively communicate with people from diverse backgrounds. Can read, write and converse fluently in English, Hindi and Marathi.
- Comprehensive understanding and hands-on experience of the Primary Mirror Control System (MICS) components (Actuators, Edge Sensors and Segment Support Assembly) of the Thirty Meter Telescope and the Prototype Segmented Mirror Telescope.
- Highly motivated and actively involved in Astronomy Outreach activities.

---

**EDUCATION :**

<b>Indian Institute of Astrophysics, Bangalore &amp; Calcutta University, Kolkata.</b> <i>PhD in Astronomical Instrumentation (Thesis Submitted)</i>	Sept 2013 – Nov 2017 Bangalore, India.
<b>Indian Institute of Astrophysics, Bangalore &amp; Calcutta University, Kolkata.</b> <i>MTech in Astronomical Instrumentation. (CGPA 9.14/10 Grade Point Average)</i>	July 2011 - Aug 2013 Bangalore, India.
<b>Shivaji University Kolhapur, Maharashtra.</b> <i>(PVPIT, Budhgaon)</i> <i>BE in Electronics and Tele-Communication. (First Class with Distinction grade)</i>	June 2006 – May 2010 Kolhapur, India.

---

**WORK EXPERIENCE (PROJECTS):**

**Indian Institute of Astrophysics, Bangalore, India. June 2020 – Present**  
*(June 2020 – Present. Working an Engineer – C at IIA, Bangalore)*

**India-TMT Coordination Center (ITCC), IIA, Bangalore. Dec 2017 – May 2020**  
*(Oct 2019 – May 2020. Worked as a Project Engineer – II for ITCC)*  
*Dec 2017 – Oct 2019. Worked as a Project Engineer – I for ITCC)*

- Working as ITCC's Work Package Manager for TMT Actuators manufacturing in India.
- This project includes managing multiple vendors for manufacturing, assembly and testing of around 1500 TMT actuators by year 2026, along with the quality,

- cost and schedule planning.
- This project involves different activities such as reviewing drawings, making vendors understand project requirements, resolving technical queries, ensuring right material is used, internal and third party inspection, providing innovative solutions, documentation, maintaining schedule and taking decisions in timely manner, etc.
- In 2018-2019, I managed prototyping activity of 20 TMT actuators with four Indian vendors. These prototype actuators were successfully manufactured, assembled, tested and shipped to TMT Project Office in USA from India. On detailed vendor evaluation all four vendors were qualified for production round.
- Working as ITCC Work Package Manager for TMT Edge Sensors manufacturing in India.
  - This project includes managing multiple vendors for process development, manufacturing, and testing of around 3000 TMT edge sensors by year 2026, along with the quality, cost and schedule planning.
  - Presently I am managing Machining, Electroless Gold Coating and Laser Etching process development activity at five Indian vendors.
- Along with Actuator and Edge sensor work packages, I am also supporting few important activities of ITCC SSA work package.
  - This includes activities like Leaf Spring process development, Leaf Spring calibration, Actuator inspection test station, Strain gauge amplifier calibration, Leaf Spring Calibration Test Station, SSA Automated Test Station development, etc.
  - This requires collaborative working with TMTPO, ITCC and different vendors and providing innovative solutions.
- Outreach activities.
  - I am actively involved in the IIAs and ITCCs outreach activities to promote Astronomy and Thirty Meter Telescope Project in India.
  - Recent activities involve developing a active 1:60 scaled model of TMT, developing interactive portal of India-TMT project, writing technical articles on India's role in TMT Project, making outreach Posters, Flyers, Videos and managing participation of India-TMT in the nationwide Mega Science Exhibition - Vigyan Samagam, etc.

***Indian Institute of Astrophysics, Bangalore, India. July 2011 to November 2017***  
*(2015-2017 Senior Research Fellow, 2013-2015 Junior Research Fellow)*

- Primary Mirror Networked Control System (NCS) for Prototype Segmented Mirror Telescope. (Nov 2016 – April 2017).
- *codeSMT* – A tool for design and analysis of Primary Mirror Control System of Segmented Mirror Telescopes. (June 2015 – Dec 2016).
- Thermal analysis of mirror material for Prototype Segmented Mirror Telescope using FEA tools. (April 2016 – July 2016).
- Design and development of a soft actuator for Prototype Segmented Mirror Telescope. (June 2015 – March 2016).
- Warping Harness Actuator Test Station for component level testing of Thirty Meter Telescope SSA WH Actuator. (October 2015- January 2016).
- Design and analysis of Voice Coil Motor (VCM) and its characterization test bed for soft actuators of segmented mirror telescope. (January- May 2015).
- Dynamic Loading Assembly (DLA) for Performance Testing of Segmented Mirror Telescope Actuators. (Jan-Nov 2014).

- Development of Precision controller for Thirty Meter Telescope Actuator (2012-2013) and for Prototype Segmented Mirror Telescope (2014-2015).
- MICS Visualization and diagnostic software for TMT. (Aug-Sept 2013).
- MICS Actuator Test Station for Functionality testing of Thirty Meter Telescope Actuator. (2012-2013).
- Vibration study of telescope mount structure at Vainu Bappu Observatory. (Oct-Nov 2012).
- Lunar Eclipse Light Intensity Observer (LELIO). (Dec 2011 - Nov 2012).

---

**INTERNSHIP  
EXPERIENCE  
(PROJECTS):**

***Thirty Meter Telescope Corporation, Pasadena, CA. (Sept 2019 to Oct 2019)***  
*(Internship)*

Project: Reliability and Demonstration Testing of TMT Warping Harness Leaf Springs. (Sept - Oct 2019).

Description: During this project work I was involved in the Reliability and Demonstration Test (RDT) of TMT Warping Harness (WH) leaf Springs manufactured in India. Tests were conducted at the Vertical Laboratories in Glandel, CA, USA. Different tests involved Leaf spring and Actuator calibration, Vacuum exposure testing, Environmental testing, Accelerated life cycle testing, etc. This provided me an opportunity and exposure to work closely with TMT PO team and gain better understanding of TMT SSA WH system. My prime responsibility was to conduct the test, analyze the test data and to develop automated analysis scripts. This test was conducted for over 2 months and all the leaf springs were found to meet TMT's reliability requirements.

***Thirty Meter Telescope Corporation, Pasadena, CA. (Feb 2018 to Mar 2018)***  
*(Internship)*

Project: Engineering Data collection and analysis of TMT Segment Support Assembly (Feb - Mar 2018).

Description: During this project work I was involved in the Segment Level Engineering Data collection and analysis of TMT SSA. TMT SSA is very complex system and needed automated test criteria to be used during large scale production and integration phase in India starting from 2020. Results of this analysis is being used for the SSA Automated Test Equipment Design Requirement Document and its hardware and software implementation.

***South African Astronomical Observatory, Cape Town, SA. (Oct 2017 to Nov 2017)***  
*(Internship)*

Project: Validation of codeSMT tool using SALT Telescope data. (Oct - Nov 2017).

Description: A project work conducted during my internship at SAAO - SALT, Cape Town, SA. The project involved validating the codeSMT tool developed by me using the actual data of Southern African Large Telescope (SALT, 10m segmented mirror telescope). The codeSMT is a tool to simulate the primary mirror control system performance of a generic Segmented Mirror Telescope. Initially the SALT telescope model was fine tuned in the codeSMT. Then the actual engineering data and telescope performance logs from SALT telescope were collected. And then the performance using the codeSMT tool was simulated and validated against the actual response. Satisfactory results were obtained. During this visit I also visited few other telescopes at SAAO Observatory site in Sutherland.

***Thirty Meter Telescope Corporation, Pasadena, CA. (July 2016 to Aug 2016)***  
*(Internship)*

Project: Development of Warping harness controller for TMT SSA. (July- Aug 2016).

Description: A project work conducted during my internship at TMT Project Office, Pasadena, CA. The project involved development of a 21 axis motion control application based on Galil Motion Controller and a python based control software. This controller was used in Reliability and Lifecycle test of TMT Warping Harness Leaf

Springs. Also same controller was used along with 2D Profilometer for measurement of the TMT Segment Support Assembly Warping harness influence function. My prime responsibility was to assemble the hardware, conduct different tests, analyze the test data and to validate the controller requirements.

***Thirty Meter Telescope Corporation, Pasadena, CA. (April 2014 to May 2014)***  
*(Internship)*

Project: Seismic analysis of TMT Actuator. (April-May 2014).

Description: A project work conducted during my internship at TMT Project Office, Pasadena, CA. The study was conducted using Actuator snubber models, Earthquake data collected from different telescope sites and a Shaker table experiment at The Pilot Group, in Monrovia, CA. This study was conducted to understand the effect of earthquake disturbance on the TMT actuator. Also during this internship, I participated in Vibration data collection project from SUBARU Telescope at Hawaii along with the team from TMT-PO.

---

**PUBLICATIONS AND REPORTS :**

Deshmukh, Prasanna Gajanan, Amaresh Mandal, Padmakar Singh Parihar, Dayananda Nayak, Deepta Sundar Mishra. "Design, development, and validation of a segment support actuator for the prototype segmented mirror telescope." *Journal of Astronomical Telescopes, Instruments, and Systems*. 2018 Feb; 4(1): 014005.

Deshmukh, Prasanna Gajanan, Padmakar Parihar, Deepta Sundar Mishra, and P. K. Mahesh. "Dynamic Loading Assembly for Testing Actuators of Segmented Mirror Telescope." *Journal of Astronomical Instrumentation*. 2017 Sep; 6(03): 1750006.

Deshmukh Prasanna, Deepta Sundar Mishra, and Padmakar Parihar. "Primary mirror active control system simulation of Prototype Segmented Mirror Telescope." In *Control Conference (ICC), 2017 Indian*, pp. 364-371. IEEE, 2017.

Deshmukh Prasanna, Padmakar Parihar, Deepta S. Mishra, Ajin Prakash, and P. M. M. Kemkar. "A soft actuator for prototype segmented mirror telescope." In *SPIE Astronomical Telescopes+ Instrumentation*, pp. 991207-991207. International Society for Optics and Photonics, 2016.

Deshmukh Prasanna and Padmakar Parihar. "Precision controller for segmented mirror telescope actuator: Control and tuning." In *Control Conference (ICC), 2016 Indian*, pp. 245-252. IEEE, 2016.

Parihar Padmakar, Deshmukh Prasanna, et al. "Prototype segmented mirror telescope: a pathfinder of India's Large Optical-NIR telescope project." In *Ground-based and Airborne Telescopes VII*. Vol. 10700. International Society for Optics and Photonics, 2018.

"Warping Harness Leaf Spring Reliability Demonstration Test Review", TMT M1 System Technical Report. TMT.OPT.TEC.19.051.REL01 (Nov 2019).

"Segment Level Warping Harness Engineering Test Results", Prasanna Deshmukh. ITCC-TMT Technical Presentation Report, (Oct 2018).

"M1 WH Component-Level Verification Test Report", TMT M1 System Technical Report. TMT.OPT.TEC.18.055.REL01. (July 2018).

"Survey of Max Acceleration using Earthquake Acceleration at TMT mirror cell". Prasanna Deshmukh, Peter Thompson. TMT Actuator Controls Technical Report. TMT.CTR.TEC.14.083.DRF01. (June 2014)

“Development of Precision controller for Thirty Meter Telescope Actuator”. Prasanna Deshmukh (M.Tech Project Thesis Report, 2013). <http://hdl.handle.net/2248/6393>

“Lunar Eclipse Light Intensity Observer (LELIO)”. Prasanna Deshmukh, Joice Mathew, Mayuresh Sarpotdar. Poster in Pro-Am 3 Meeting at HBCSE, Mumbai. (Oct 2013). And a report in Newsletter of Indian Institute of Astrophysics, Volume 16 Number 4, (December 2011).

“A New Window to the Universe” technical article in “Pushing the frontiers of Science” booklet of Vigyan Samagam. (April 2019).

“Thirty Meter Telescope Project” technical article in “Particle Wave” magazine of Vigyan Samagam. (Aug 2019).

---

**PRESENTATIONS:**

‘Prototyping of Soft Actuators for Thirty Mirror Telescope in India’. Poster presentation at the meeting of Astronomical Society of India (ASI-2020), IISER Tirupati, India. (Feb 2020).

‘Dynamic Loading Assembly for Testing Actuators of Segmented Mirror Telescope.’ Best Instrumentation Paper Award presentation at Indian Institute of Astrophysics, Bangalore. (Aug 2019).

‘The Thirty Meter Telescope Project’. Seminar at AstroComm Meet 2019 at Jawaharlal Nehru Planetarium, Bengaluru. (Feb 2019).

‘Seminar on Thirty Meter Telescope Systems: Edge Sensors’. Oral presentation at Indian Institute of Astrophysics, Bangalore. (Jan 2019).

‘Seminar on Thirty Meter Telescope Systems: M1CS Actuators’. Oral presentation at Indian Institute of Astrophysics, Bangalore. (Oct 2018).

‘Wind disturbance effect on PSMT Segment Support Actuator - Modeling and Controls’. Poster presentation at the meeting of Astronomical Society of India (ASI-2017), Jaipur, India. (March 2017).

‘A Programmable System on Chip (PSoC) based Controller for the PSMT Segment Support Actuators’. Poster presentation at the Meeting of Astronomical Society of India (ASI-2017), Jaipur, India. (March 2017).

‘Primary Mirror Active Control System Simulation of Prototype Segmented Mirror Telescope’. Oral presentation at IEEE Indian Control Conference (ICC 2017), IIT Guwahati. (Jan 2017).

‘A Soft Actuator for Prototype Segmented Mirror Telescope’. Oral presentation at SPIE AT&I 2016 Conference, Edinburg, UK. (June-2016).

Simulator for Primary Mirror Control System of Segmented Mirror Telescope: Oral presentation at Meeting of Astronomical Society of India (ASI-2016), University of Kashmir. (May 2016).

‘Precision Controller for Segmented Mirror Telescope Actuator: Control and Tuning’. Oral presentation at IEEE Indian Control Conference (ICC 2016), IIT Hyderabad. (Jan 2016).

‘Performance testing of Thirty Meter Telescope Actuator at ITCC Laboratory’. Oral

presentation in TMT Science Workshop 2015 at IIST-ISRO, Thiruvananthapuram, India. (11-13 June 2015).

Poster presentation on 'Dynamic loading assembly for performance testing of Segmented Mirror Telescope Actuators' at Meeting of Astronomical Society of India (ASI-2015), NCRA Pune, India. ( Feb 2015).

Development of Primary Mirror Control System for Segmented mirror telescopes, Activities at ITCC Laboratory: A oral presentation in TMT Science Workshop 2014 at ARIES, Nainital, India. (Nov 2014).

Primary Mirror Control System for Segmented Mirror Telescopes - Activities at ITCC laboratory: Oral presentation at India-South Africa Flagship meeting at IIA Bangalore. (15-16 Sept 2014).

Control and Tuning of Segmented mirror telescope Actuator: Oral presentation at Meeting of Astronomical Society of India (ASI-2014), IISER Mohali. (March-2014).

TMT Edge sensor and Actuator activities at ITCC Laboratory: A presentation in 'ITCC Science and Instrumentation Workshop' at IIA Bangalore. (Dec 2013).

Development of Precision controller for Thirty Meter Telescope Actuator. A technical seminar at IIA, Bangalore. (Sept 2013).

---

**ACHIEVEMENTS :**

Best Poster Award (ASI-2020) for the poster "Prototyping of Soft Actuators for Thirty Mirror Telescope in India" presented in Meeting of Astronomical Society of India (ASI-2020), IISER, Tirupati, India.

Best Instrumentation Paper Award (2017) of Indian Institute of Astrophysics for the paper "Dynamic Loading Assembly for Testing Actuators of Segmented Mirror Telescope." By - Deshmukh, Prasanna Gajanan, Padmakar Parihar, Deepta Sundar Mishra, and P. K. Mahesh. Published in Journal of Astronomical Instrumentation. Vol 6, No. 3, 1750006 (2017).

Best Poster Award (ASI-2015) for the poster "Dynamic loading assembly for performance testing of Segmented Mirror Telescope Actuators" presented in Meeting of Astronomical Society of India (ASI-2015), NCRA Pune, India.

Junior Research Fellowship and Senior Research Fellowship from Indian Institute of Astrophysics towards Ph.D (2013, 2015).

Appointed as member of Public Outreach Committee of Indian Institute of Astrophysics, Bangalore (2013 to 2016, 2020 to present).

Qualified in the Graduate Aptitude Test in Engineering (GATE) for Electronics & Communication Engineering (ECE), (2011).

'Distinction' degree for Bachelor's of Engineering, awarded by Shivaji University Kolhapur. (2010).

First position in TECHxPO Project Competition at PVPIT Budhgaon. (2010).

ISRO's National level Student Participation Program for IAC 2007, Finalist. (2007).

---

**SOFTWARE SKILLS :** MATLAB, Simulink, DipTrace, SolidWorks, FEMM, LabVIEW, ZEMAX, OriginPro, Python, C, Embedded C, PSoC Creator, Microsoft Office.

---