PO-14P

TMT eArly Career Centered, Engineers–Scientists Synergy (TMT–ACCESS)

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The Thirty Meter Telescope (TMT) is a planned next–generation telescope with extendedly higher sensitivity and resolution, allowing us to answer remaining open questions about the universe, such as a search for life outside our solar system and a better understanding of the evolving ecosystem of galaxies. The TMT International Observatory (TIO), responsible for the operation and construction of the TMT, recently conducted the NSF PDR (Preliminary Design Review) and scientific discussions through workshops and White Papers are being accelerated. Taking advantage of the overall momentum, we will organize a series of science workshops called TMT–ACCESS (TMT eArly Career Centered, Engineers–Scientists Synergy) to enhance TMT science and foster the creation of new science cases.TMT–ACCESS is a cross–disciplinary science workshop that puts emphasis on discussions to comprehensively explore new science cases for the TMT under the updated construction timeline. That will facilitate interactions among researchers from different fields, leading to the development of innovative science cases at the boundaries of each discipline. Moreover, it offers opportunities that promote mutual understanding between engineers and scientists, providing a platform to foster planning and proposing next–generation instruments based on science cases.Given a limited number of recent opportunities in Japan, where early–career researchers can consider future projects with next–generation extremely large optical/IR telescopes, this series will facilitate interactions among researchers from different fields, not only science but also engineering, aiming to foster the researchers who will lead the development of innovative science cases at the boundaries of each discipline. The first workshop was held in September 2023 at TMT International Observatory (Pasadena, CA, USA), the second one was held in June 2024 at Tohoku University (Sendai, Japan), and the third workshop on July 16–18, 2025, at NAOJ (Mitaka, Japan). We plan to hold the TMT–ACCESS series annually and also seek opportunities to expand the current framework to an international workshop, not limited to TMT but also GMT/E–ELT, so that early–career researchers can interact with those in adjacent communities within the Asia–Oceania area.

What is TMT-ACCESS?

Early-Career Focus

A dedicated workshop series designed as a gateway to TMT science for early-career researchers (graduate students , postdocs & early-career fuculty).

New Science Cases

Aims to develop innovative science cases for TMT tailored to the revised construction timeline and future landscape.

Project Updates

Provides direct opportunities to learn about the latest progress and initiatives of TMT Project.

Interdisciplinary Discussion

A discussion-centered format that bridges the gap between science and engineering, fostering synergistic collaboration.

Three Pillars of Workshop Design

TMT-ACCESS is built on a foundation of interactive learning, hands-on experience, and expert knowledge sharing.

01

Group Discussion

Collaborative brainstorming sessions, problem-solving activities, and peer feedback loops designed to foster innovative ideas and build strong research networks.

02

Lab Tour

Hands-on exposure to advanced instruments, laboratories, and facilities, providing a tangible understanding of the hardware behind the science.

03

Lecture

In-depth talks from experts on TMT science cases, next-generation instrumentation, and observatory operations, laying the groundwork for future proposals.

Workshop Process

From Learning to Proposal: A Structured Journey

1 **LEARNING**
Lectures and lab tours build a shared knowledge foundation on TMT capabilities.

2 **DISCUSSION**
Intensive, facilitated group discussions to brainstorm and refine scientific ideas.

3 **PROPOSAL**
Teams develop concrete future research & instrument concept proposals.

4 **PRESENTATION**
Final presentation of proposals with constructive feedback from experts.

TMT-ACCESS 2025 at NAOJ

Group Discussion

★ **Discussion Theme**

“Challenges in Developing Instruments to Achieve Extreme Performance and Toward Breakthroughs”

★ Conducted with the Same Members for Three Days
- Participants were divided into six groups based on the instrument they wished to discuss.
- Each group was assigned an expert instrument developer specializing in that instrument.
- advisor rotated among the groups.

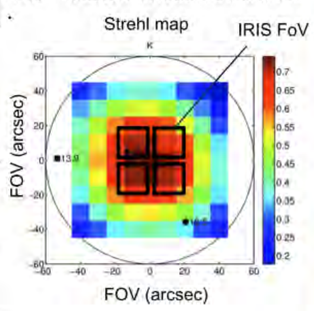
★ Group Discussions Designed in Three Step
to Enable More Realistic Considerations of Instrument Performance
- Identifying desired instrument capabilities and the science enabled by the instrument (science cases were given as prior assignments).
- Discussing the feasibility of achieving the required instrument performance.
- Examining realistic performance goals and corresponding development plans.

TMT-ACCESS 2025 at NAOJ

Example of Group Discussion (MOS)

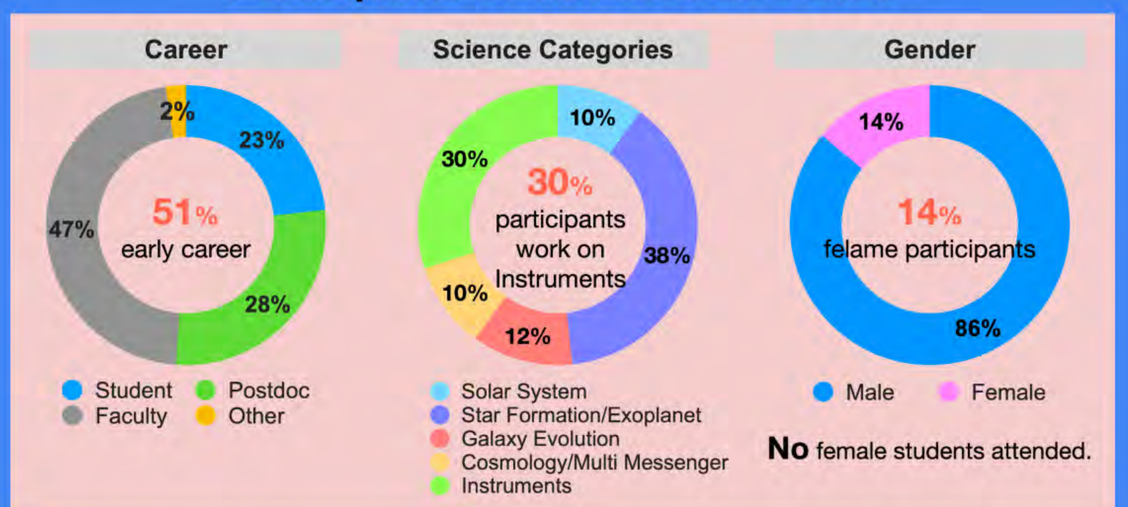
No.	Parameters	Performances (required)	Development Levels	Development Costs	Science Cases
1	R	K~23 for M81 K~25 for NGC4946 5000	Lv.0 (Current IRIS)		Spectroscopic observation of SN progenitors (RSG,WR) in M81, NGC6946 P-cygni profile of SN progenitors (RSG,WR) in M81, NGC6946
2	R Field of view # of laser guide stars	K<25 5000 2 x 2 arcmin^2 One more ring outside the current LGS	Lv.3 (IRMS + NFIRAOS with extended field)		Spectroscopic observation of SN progenitors (RSG,WR) in 100 nearby galaxies P-cygni profile of SN progenitors (RSG,WR) in 100 nearby galaxies

IRMS + NFIRAOS with extended field of view



TMT-ACCESS 2025 at NAOJ

Participants of TMT-ACCESS 2025



TMT-ACCESS 2025 at NAOJ

Participant Profile (3 years)

