

TMT Early-Career Initiative

2017 TMT Science Forum Mysuru, India

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Today

- History and local workforce development in Hawaii (Lisa Hunter)
- TMT Early-Career Initiative
 - 2016 & 2017 “TMT Early-Career” workshop (Austin Barnes)
 - Next steps in development and where we need your input (Nicholas McConnell)

Definitions

- “Workforce development”:
 - Preparing and advancing people from for specific career paths
 - Includes academic, industry, government positions
 - Utilizing full diversity of population
- “Early-career”: graduate students, postdoctoral researcher, others in early stages of career

Why TMT is partnering with ISEE to develop a workforce development program

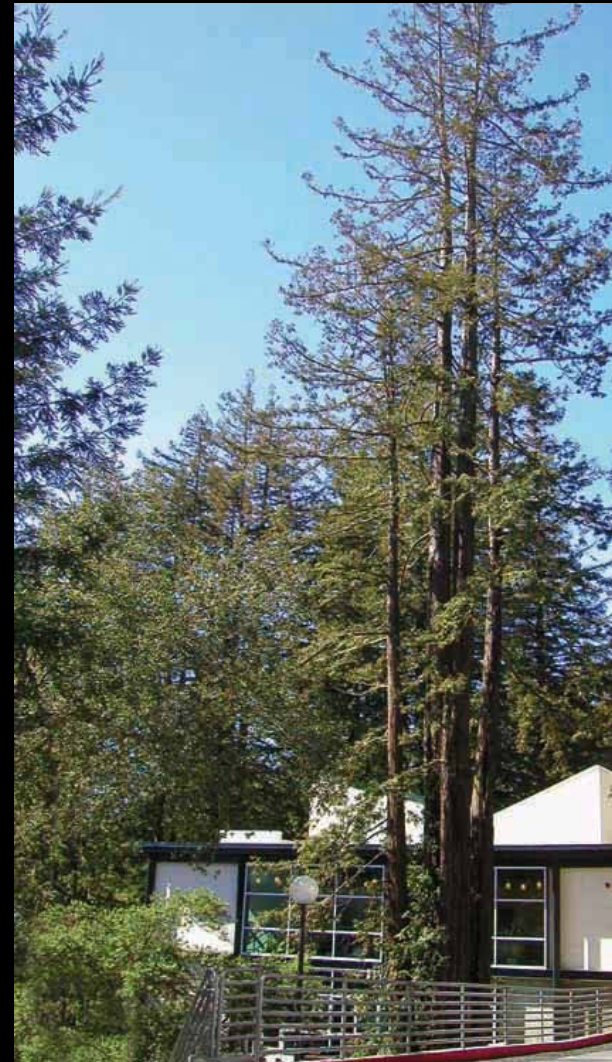
Center for Adaptive Optics (CfAO)

Directors: Jerry Nelson; Claire Max

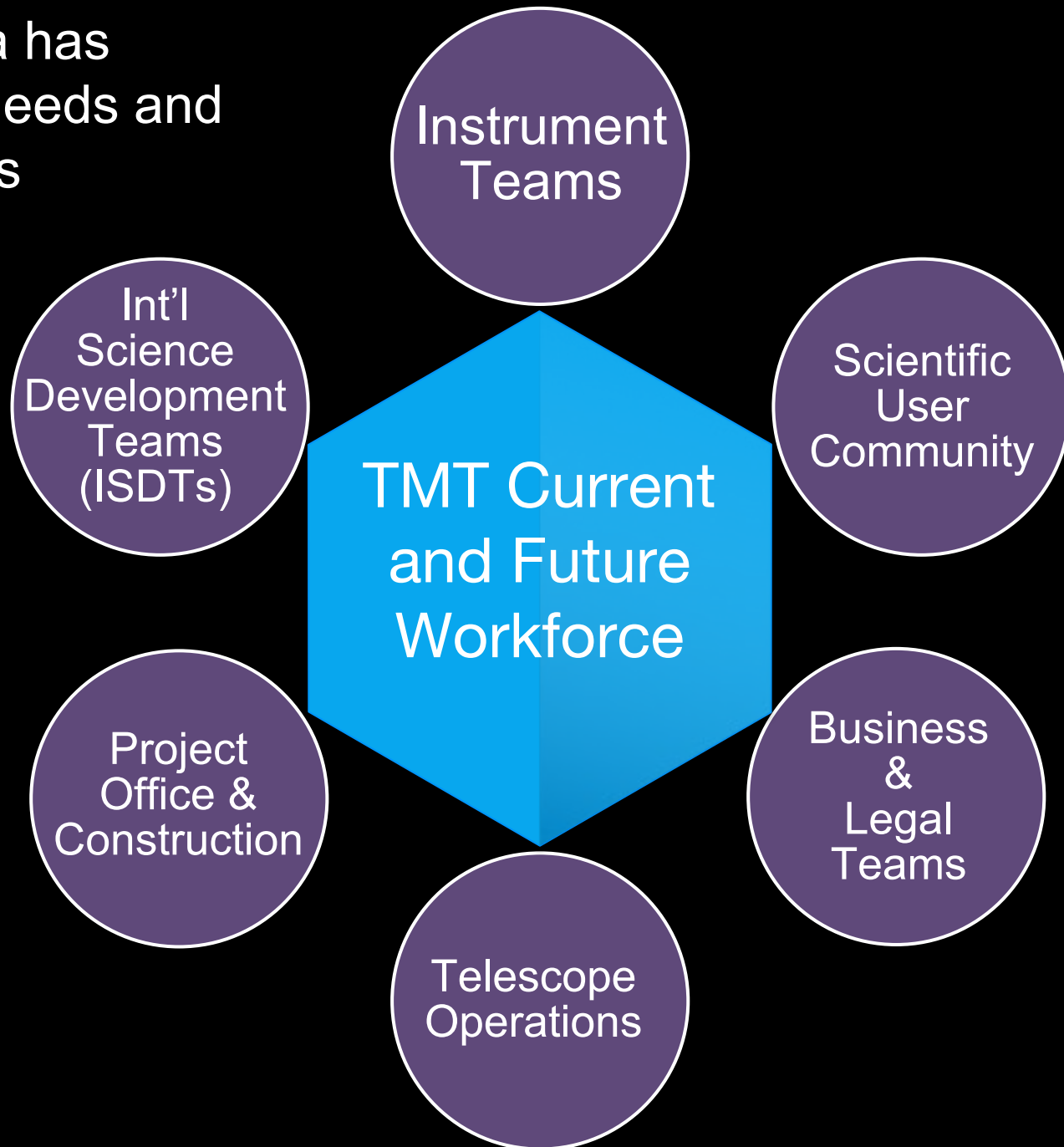
CfAO's education and workforce development program became



Institute for Scientist & Engineer Educators (ISEE)



Each area has
different needs and
challenges



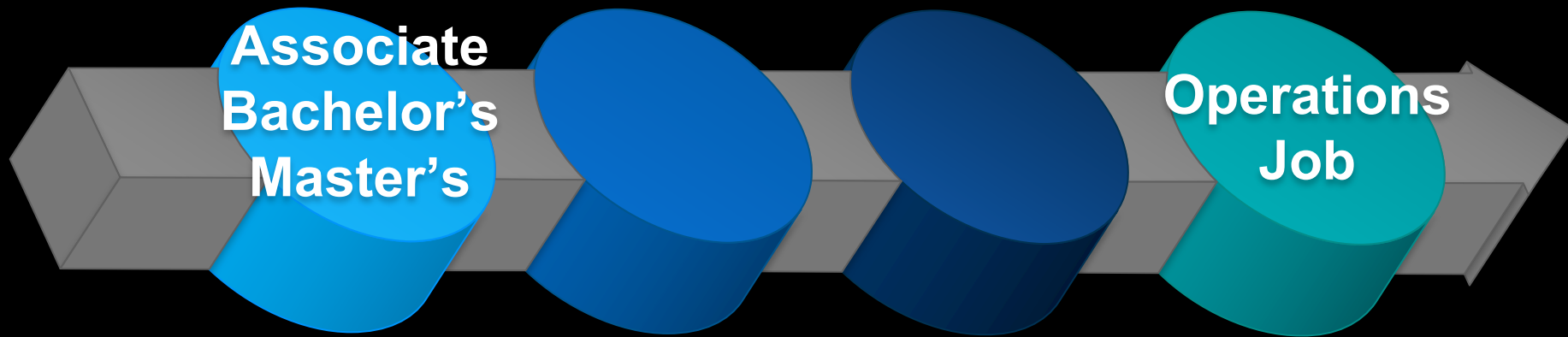
Challenge for telescope operations: Remote sites that draw from small local populations



Local workforce is essential for the success of
telescopes in Hawaii:

- Telescopes need a local workforce
- Hawaii community hosts telescopes and wants jobs for local population

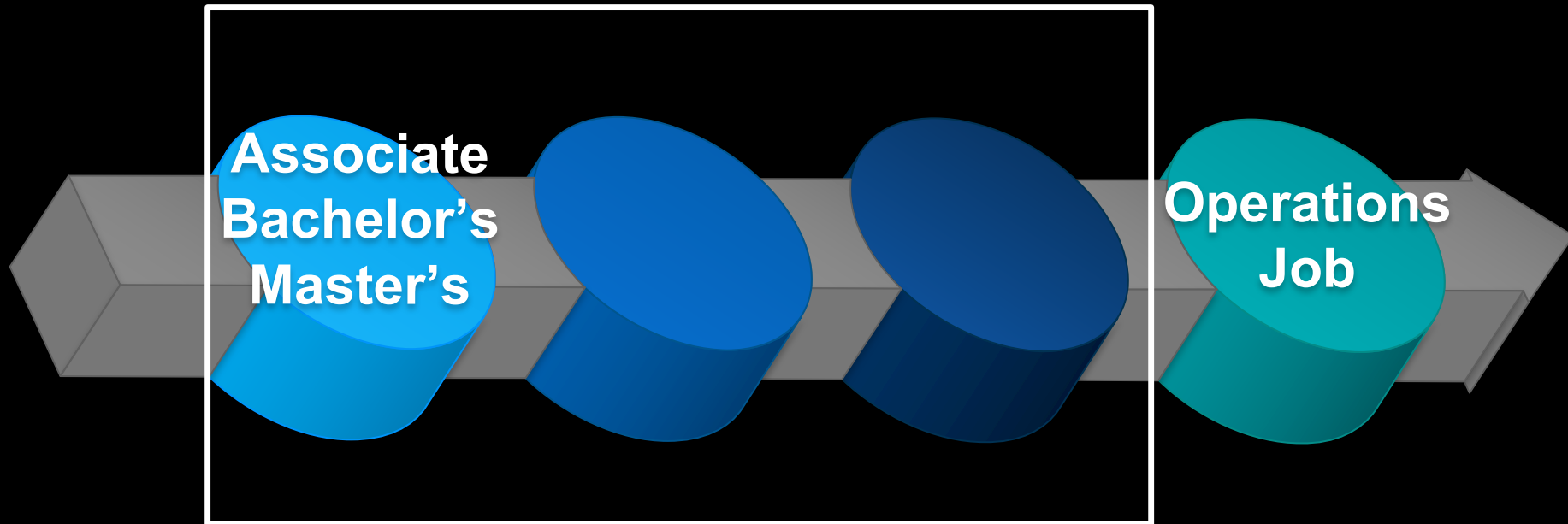
Career Progression: Telescope Operations



Engineering
Computer science
Electronics
Information technology

ISEE's Akamai Internship Program places college students at existing telescopes

“Akamai”: smart or clever in Hawaiian



TMT is major funder of Akamai

INSTRUMENT TRANSFER SHOCK REDUCTION DESIGN CONCEPTS

Jeri Goodin

Univ. of Hawaii mechanical
engineering major

Akamai internship at
W.M. Keck Observatory



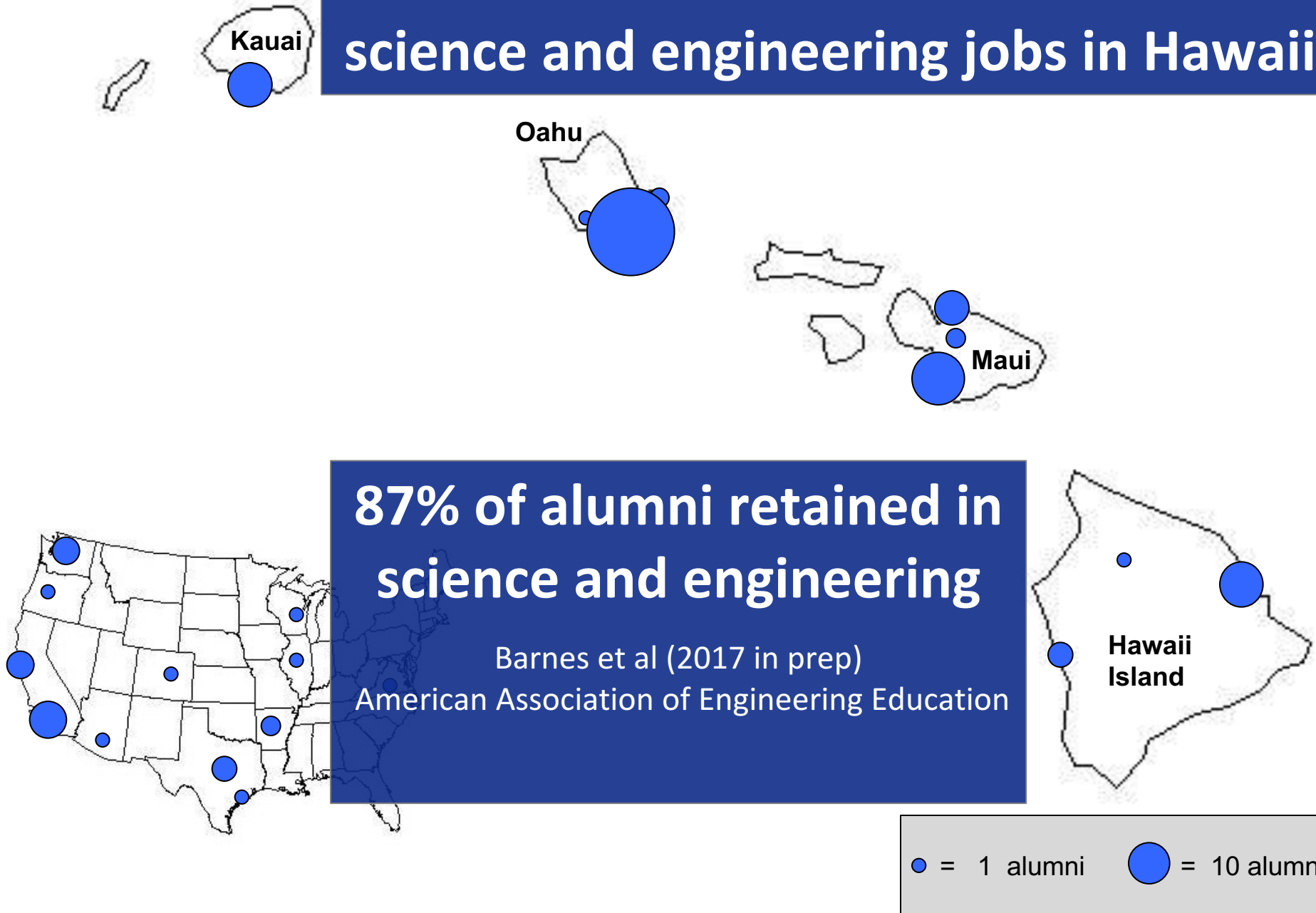
Akamai Internship host organizations and number of interns hosted, 2003-2017 (total 356)

W.M. Keck Observatory	42
Institute for Astronomy, Maui	37
Gemini Observatory	31
Akimeka	26
Subaru Telescope	25
Trex Enterprises	23
SMA/ASIAA	23
Institute for Astronomy, Hilo	18
Canada-France-Hawaii Telescope	16
Oceanit	15
Hnu Photonics	14
Pacific Disaster Center	14
TMT International Observatory	10
Textron Systems	11
UH Hilo	10

MHPCC	10
NELHA	7
Air Force Research Laboratory	8
IAI/Pacific Defense Solutions	7
Daniel K Inouye Solar Telescope	7
PJITC/2C4	5
Boeing	3
Northrop Grumman	4
Big Island Abalone Farm	3
Cellana	3
PISCES	2
UH Maui College	2
Makani Kai	2
Caltech	2
University of California, Santa Cruz	1
NOAA	1

~75% of placements at telescopes/astronomy

>100 Akamai alumni are now in science and engineering jobs in Hawaii



Our message in Hawaii as TMT moves through site selection:

- Telescopes provide good technical jobs
- Akamai partnership with telescopes has led to local hires
- TMT is essential funder and partner of Akamai

Hilo local hired as an engineer for telescope



Brialyn is 4th Akamai alumnus engineer hired by DKIST: Demonstrates how TMT can do the same

ISEE is now developing a program for the
TMT International Observatory

Canada

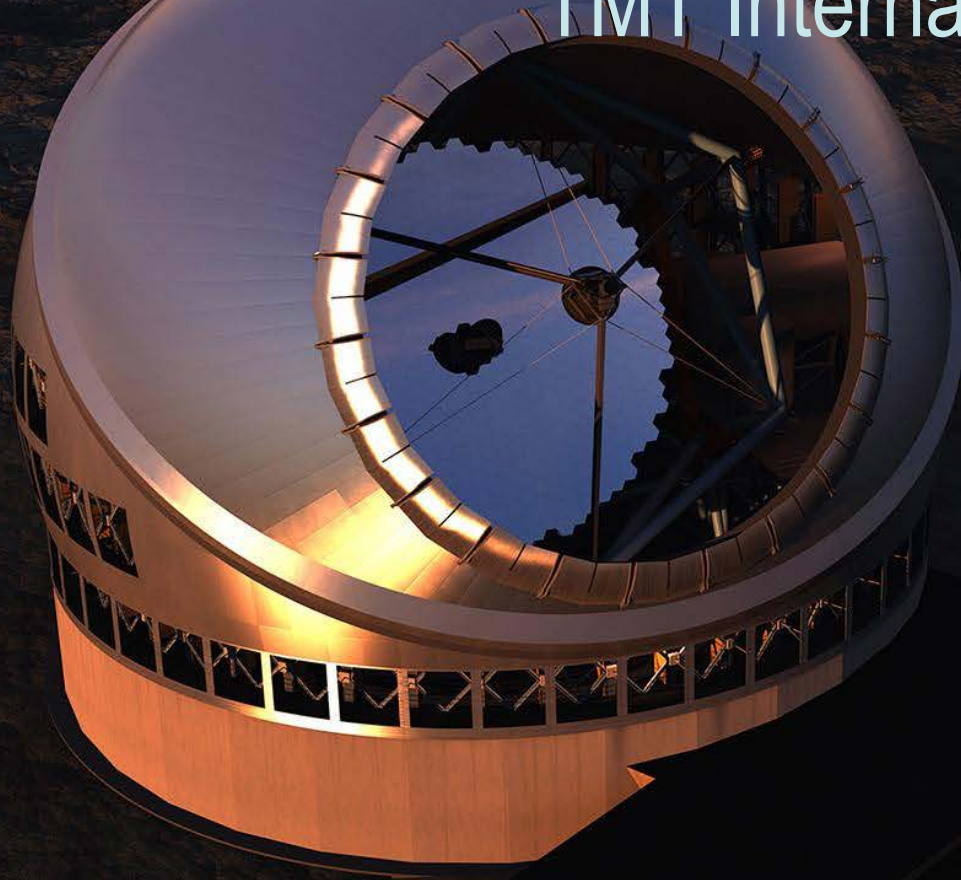
China

India

Japan

Caltech

UC



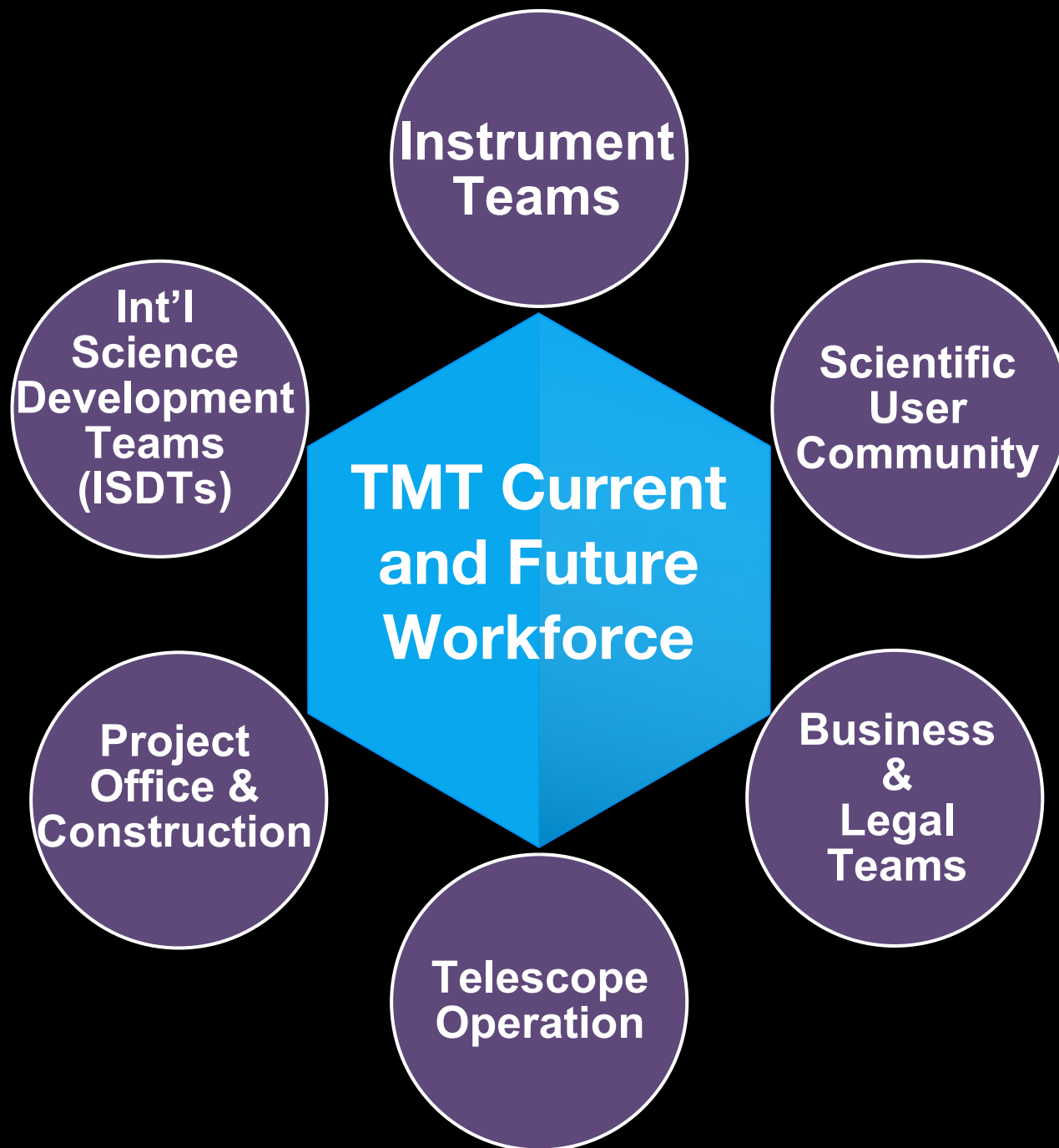
TMT workforce opportunities and challenges

Full participation of all partners is essential to maximizing the scientific output of TMT – now and into the future

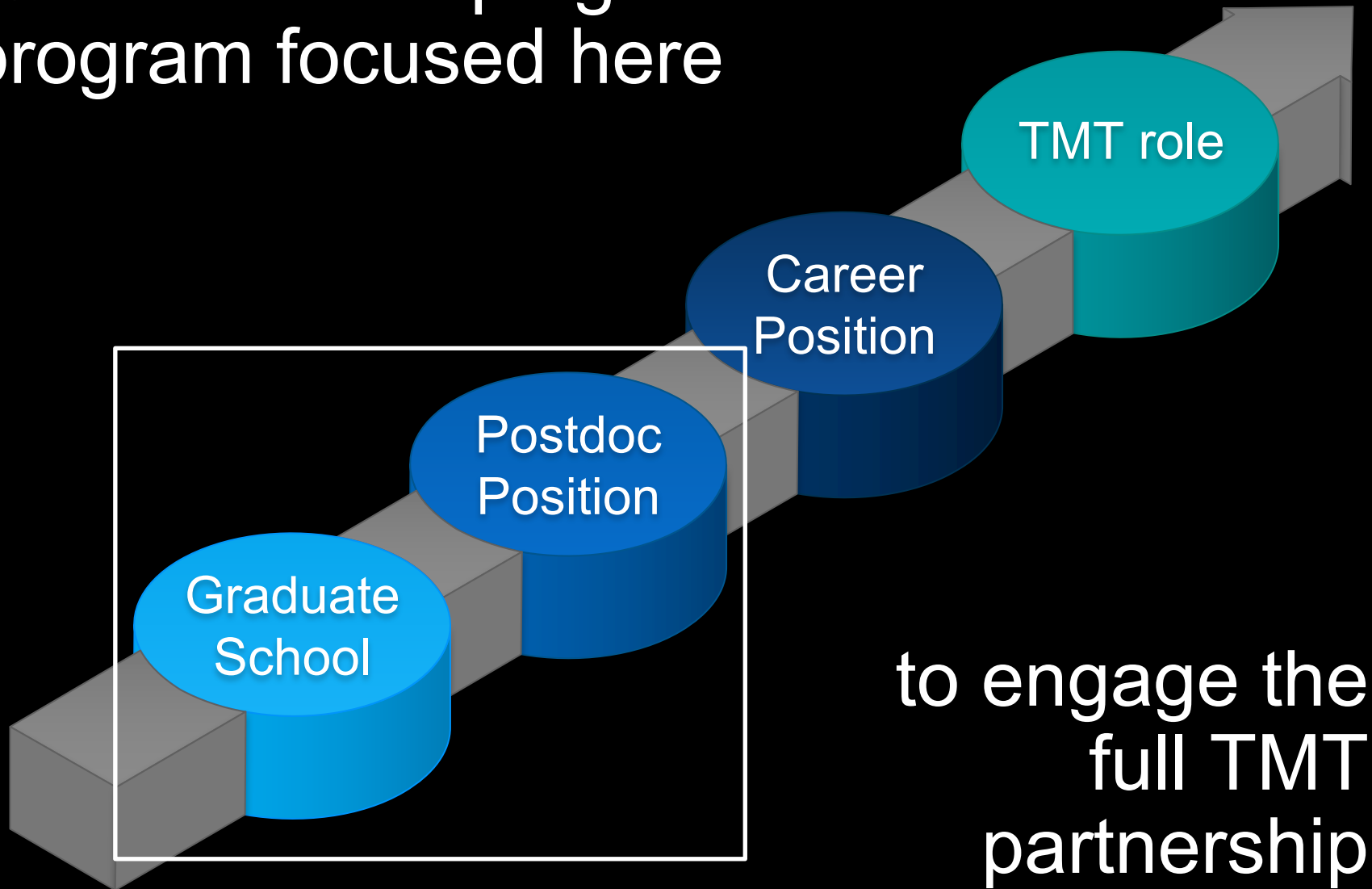
Working across cultures and large geographic distances is essential

TMT is a unique opportunity to train tomorrow's scientific and technical leaders

ISEE is working with the TMT community to develop a workforce development program to support the TMT partnership

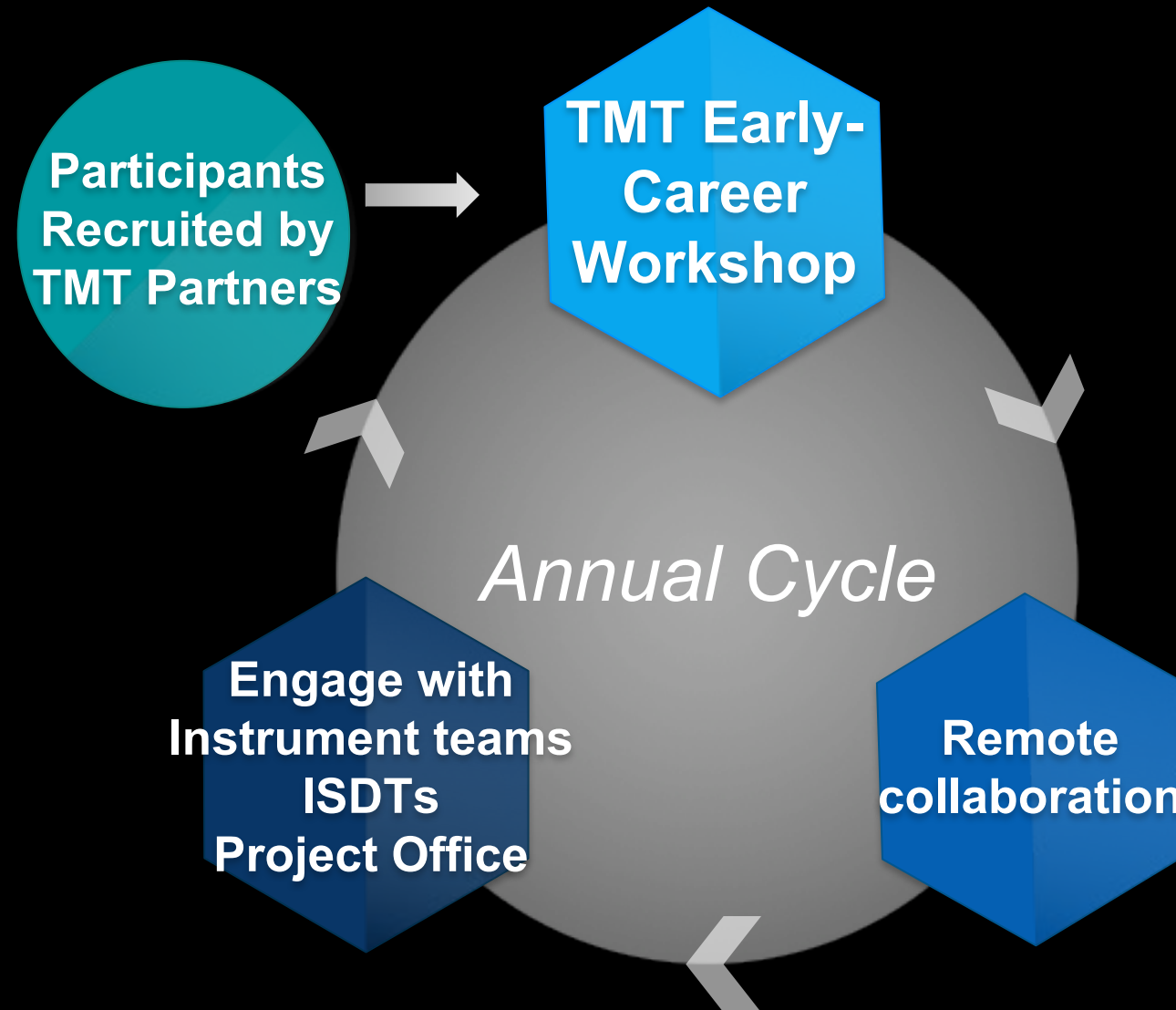


ISEE is developing a
program focused here



to engage the
full TMT
partnership

TMT Early-Career Initiative

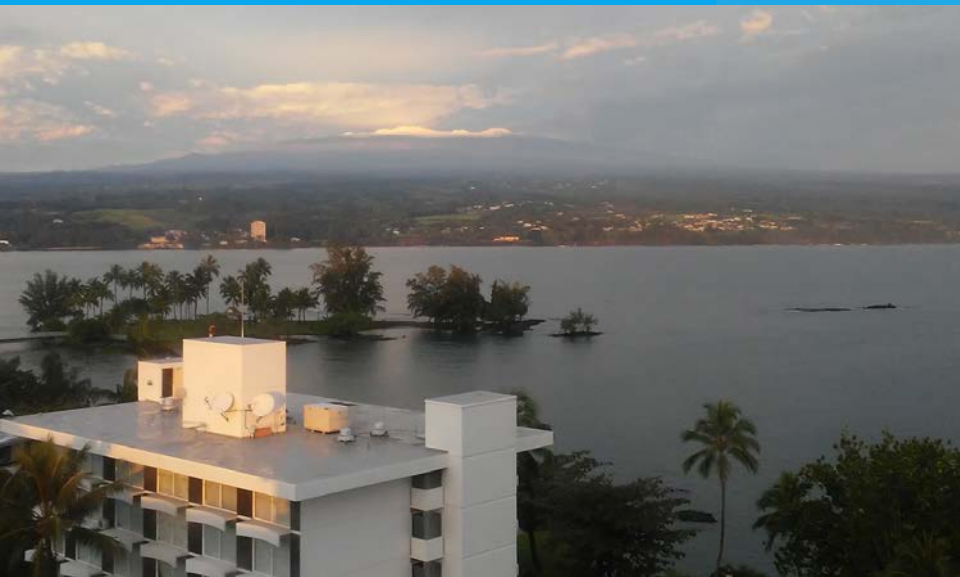


- Engaging all TIO partners in program design
- Focus on skills for large projects & international collaborations
- Pipeline into TMT instrument & science projects

Early-Career Workshop: Dec 3-7, 2016 - Hilo, Hawaii

35 grad students and postdocs
from Canada, China, India, Japan,
Caltech and the University of
California

- Presentations by TMT leaders
- Keck and CFHT base facility tours
- Brief instrument design session

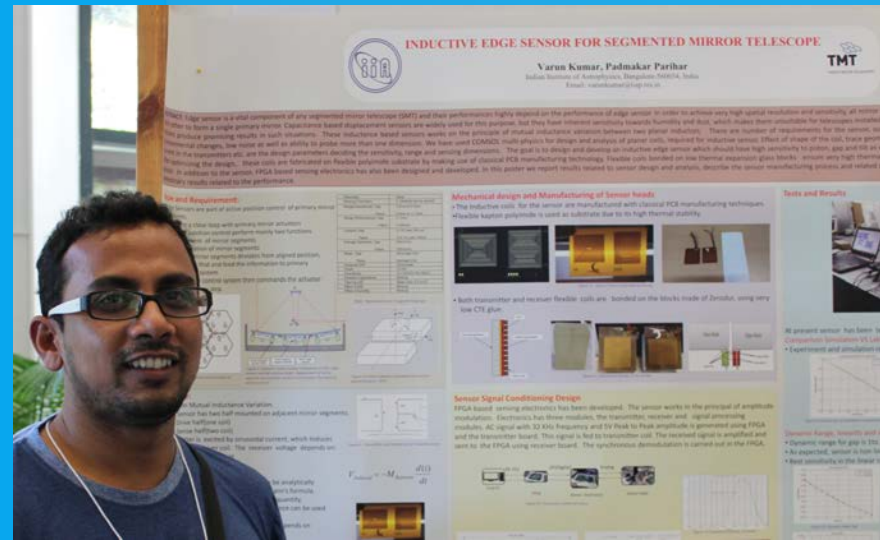




Early-Career Workshop: Aug 22-29, 2017 - Santa Cruz

42 grad students and postdocs from
full partnership

- Presentations by TMT project office and WFOS leaders
- UC Observatories facilities tours
- Poster session
- **Collaborative project sessions**



TMT Early-Career Workshop

Sessions requiring small international teams to collaborate



- Extended second generation instrument design session
- Mini-projects in small groups *which will evolve to stimulate increased post-workshop involvement*



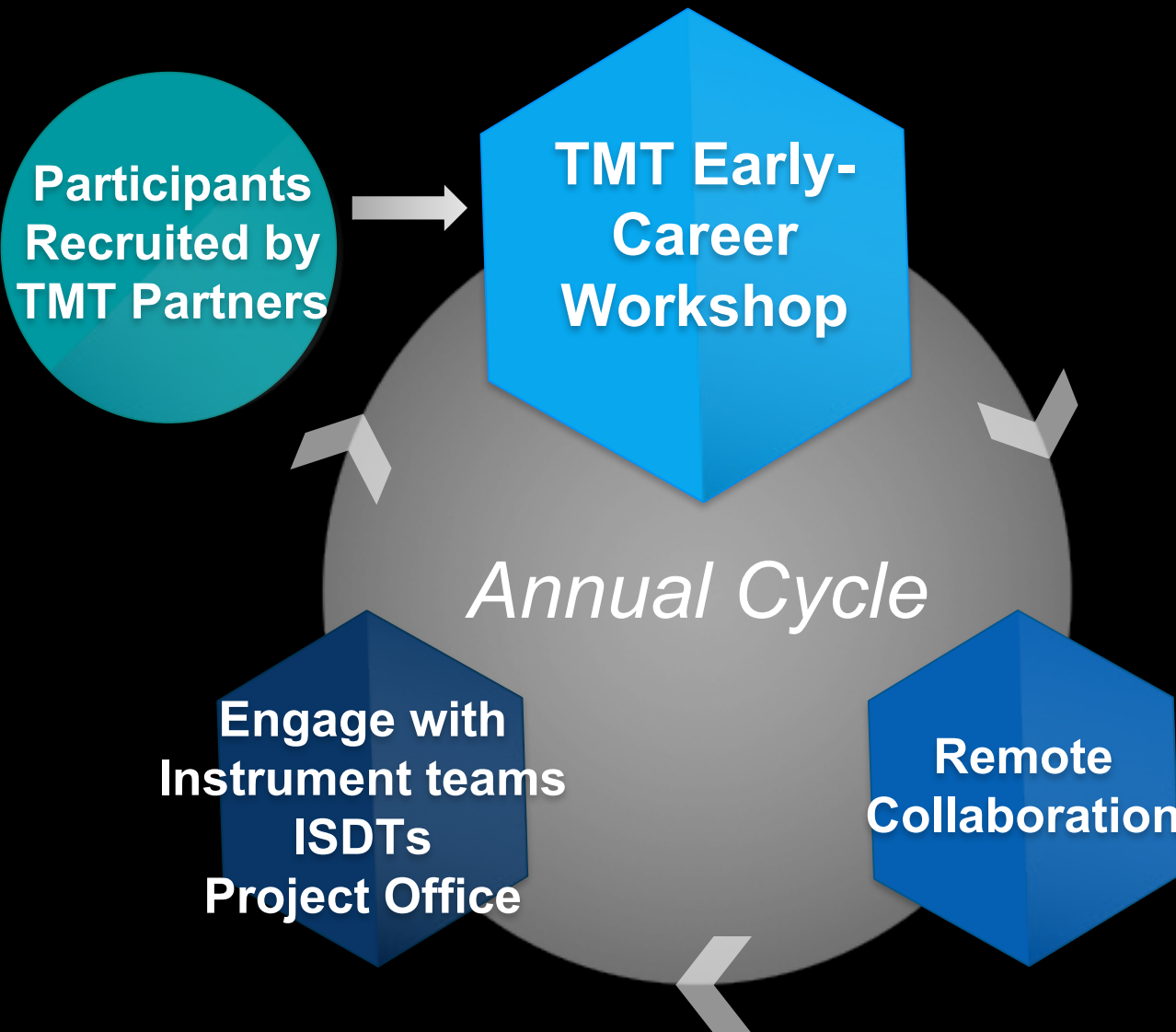
Early-Career Workshop

Mini-projects: 4 hours of working time



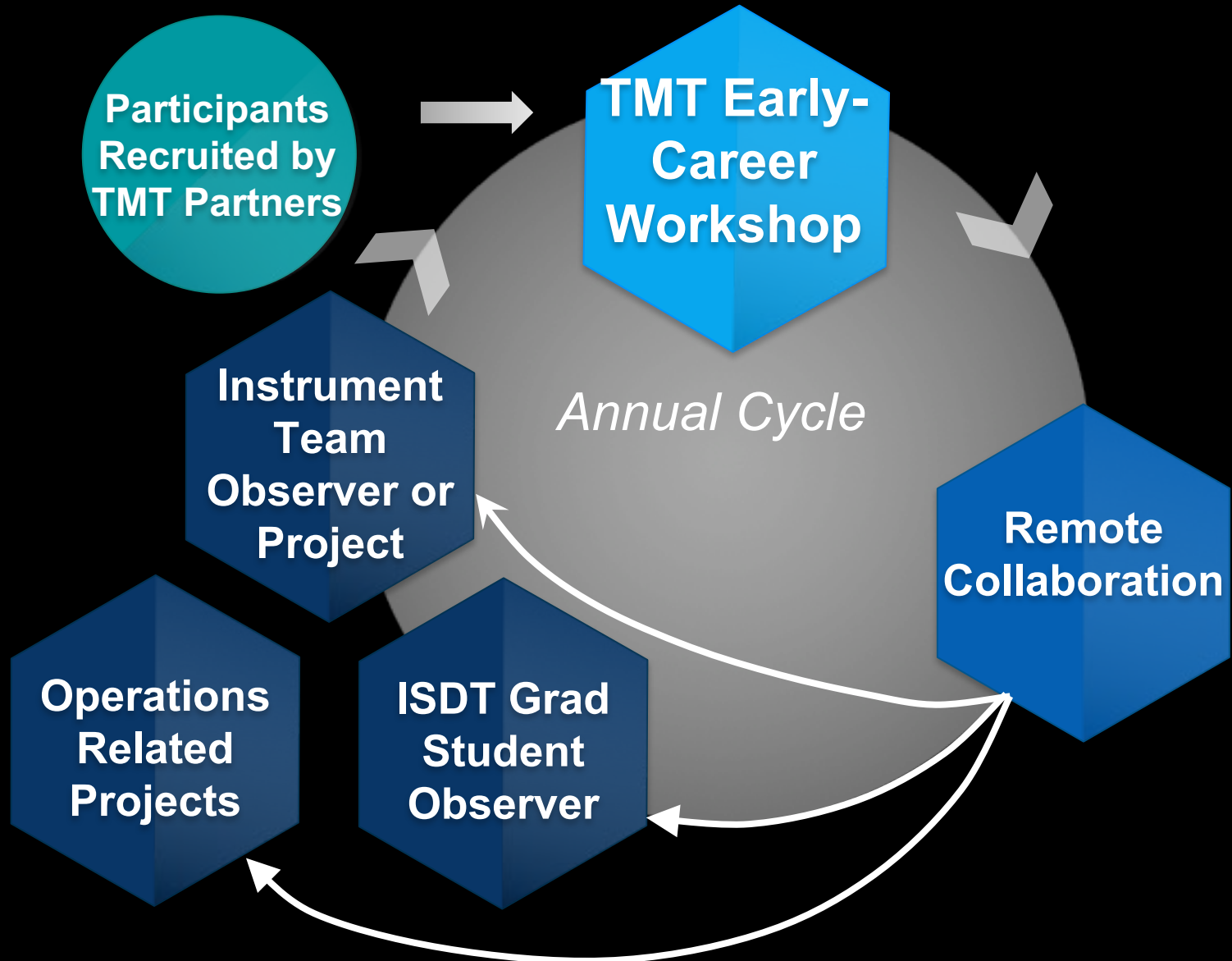
- **Processes for TMT detailed science case involvement from full partnership**
- **Template for TMT detailed science case submission**
- TMT data pipeline and archive use cases
- Scientist and Engineer Cross-Talk
- **Early career participation at TMT Forum**
- Career Marketplace
- Emerging Technologies

TMT Early-Career Initiative



- Engaging all TIO partners in program design
- Focus on skills for large projects & international collaborations
- **Pipeline into TMT instrument & science projects**

TMT Early-Career Initiative: post-workshop projects/activities



TMT projects/internships for graduate students and postdocs: factors we are considering

Advising

- ◆ Involving advisors from the time of application through internship

Context of involvement

- ◆ ISDTs
- ◆ Instrument Teams
- ◆ Project Office

Selection and Matching

- ◆ Involving ISDT or instrument team members
- ◆ Via workshop projects
- ◆ Applications before and after the workshop

Thesis alignment

- ◆ How projects align with current work or are supplemental for career development

Scope and Scale

- ◆ Time commitment
- ◆ Travel vs. remote
- ◆ Resource availability

Recognition

- ◆ Peer-reviewed publication
- ◆ Institutional or TMT technical notes
- ◆ Other forms

Example: short project with TMT Project Office (piloted at 2017 Early-Career Workshop)

Before workshop

Workshop and Project Office leaders identify projects
(e.g., - use case for processed & archived data
- template for contributing to Detailed Science Case)

During workshop

Workshop leaders assess participant interest and assign to projects

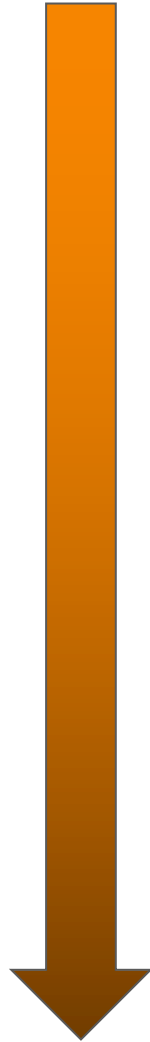
Participant teams work on projects with guidance from Project Office leaders (~4 hr working time)

Teams document project work

Follow-through

Participants propose to advance project further

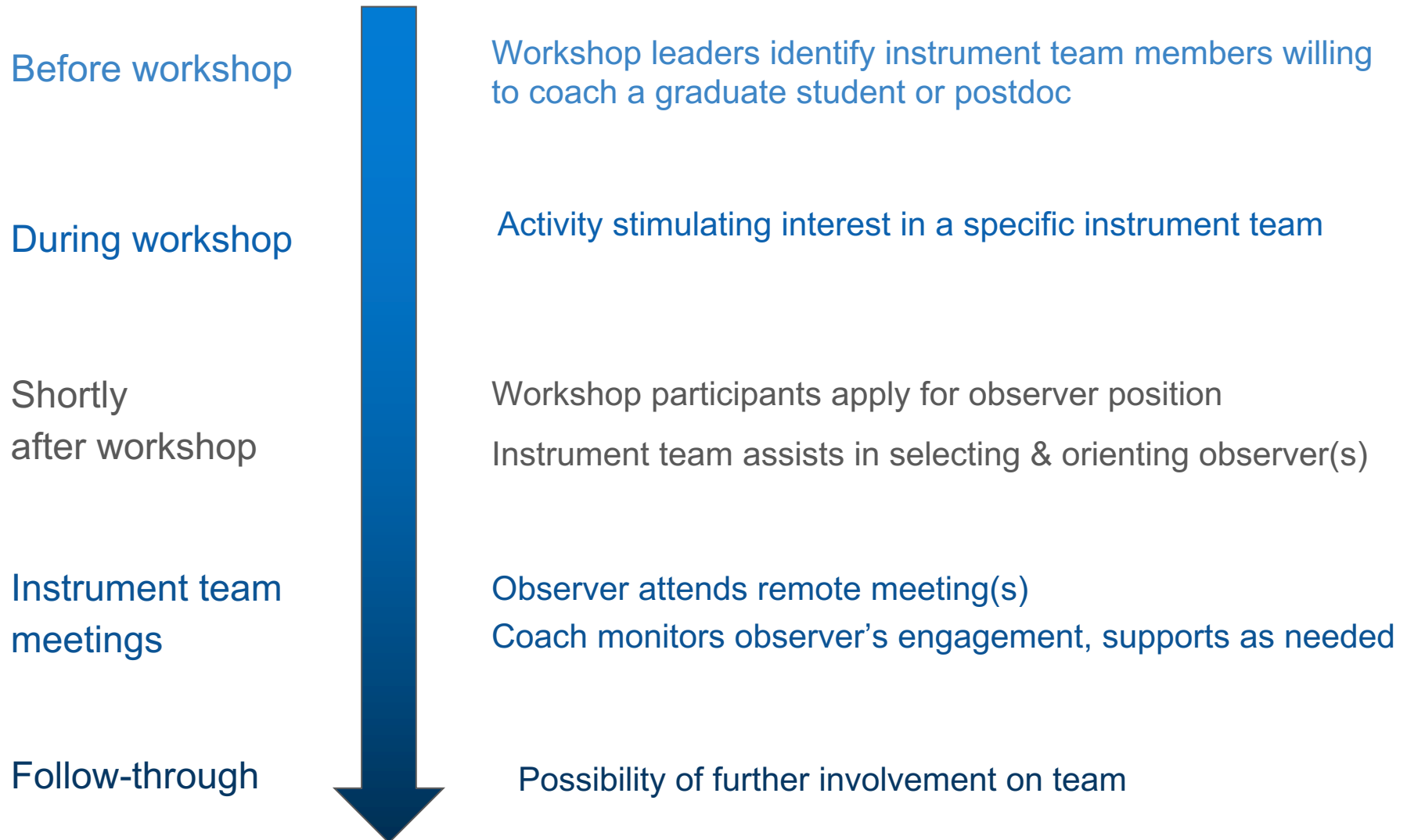
Participants and Project Office leaders work remotely or in person



Example:

Instrument team involvement following Early-Career Workshop

Low-responsibility “observer” mode



TMT Early-Career Initiative

