

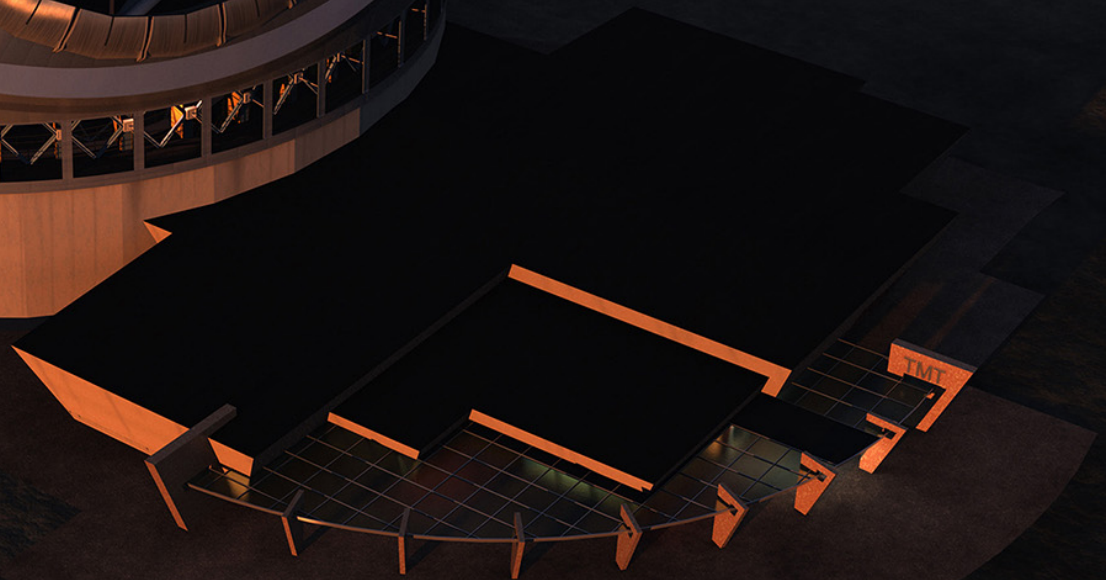
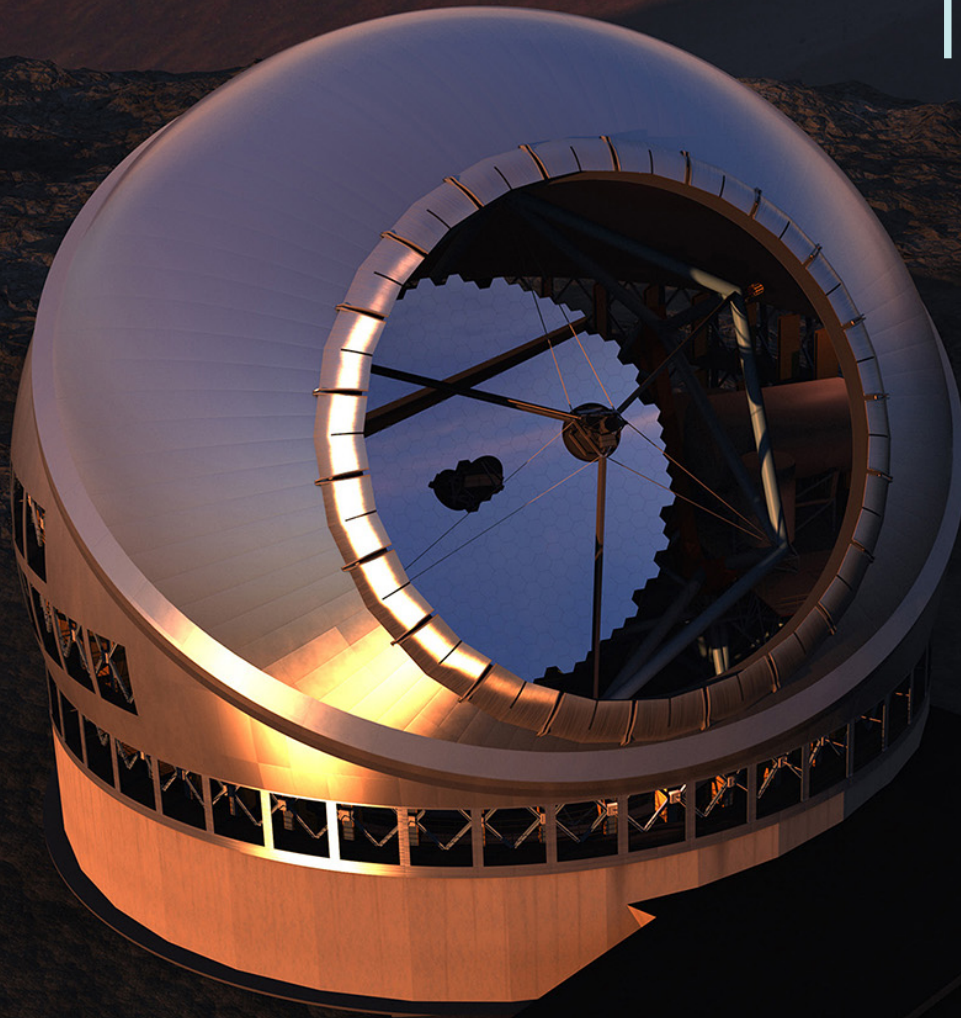
# **Developing a New International Training Program for the Thirty Meter Telescope**

**Lisa Hunter**

**Institute for Scientist & Engineer Educators (ISEE)  
University of California, Santa Cruz**

**2015 TMT Forum  
Washington DC**

TMT is embarking on  
a significant  
engineering,  
scientific,  
and *cultural*  
endeavor ....





...while also developing the most diverse astronomical  
community ever formed



# **Reaching the full potential of TMT**

Full participation of all partners is essential to TMT's success

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



**Workforce development is  
a means of training today's  
undergraduates, graduate  
students, and postdocs to be  
future leaders in TMT**

# TMT's Current and Future Workforce

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Instrument  
Teams

International  
Science  
Teams

System  
component  
teams

Project  
Office &  
Construction

Telescope  
Operations

Scientific  
User  
Community

Business Groups

Legal Teams

# Some Examples Important Skills a Workforce Development Program Could Focus on

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- Technical skills: instrumentation, systems engineering, adaptive optics, etc.
- Professional skills:
  - Project management
  - Communication
  - Teamwork
  - Leadership
  - Teaching and mentoring
- Cultural competency: ability to work with diverse international teams with different cultural norms



## **Examples of Workforce Development Activities**

- **“Summer schools” (1-2 weeks)**
- **Internships**
- **Extended projects/exchanges**
- **Workshops**

ABOUT

PEOPLE

PROGRAMS

PROJECTS

COLLA

Contact Us

Location

ISEE Publications

Funding

Funding

Contact Us

Location

ISEE Publications



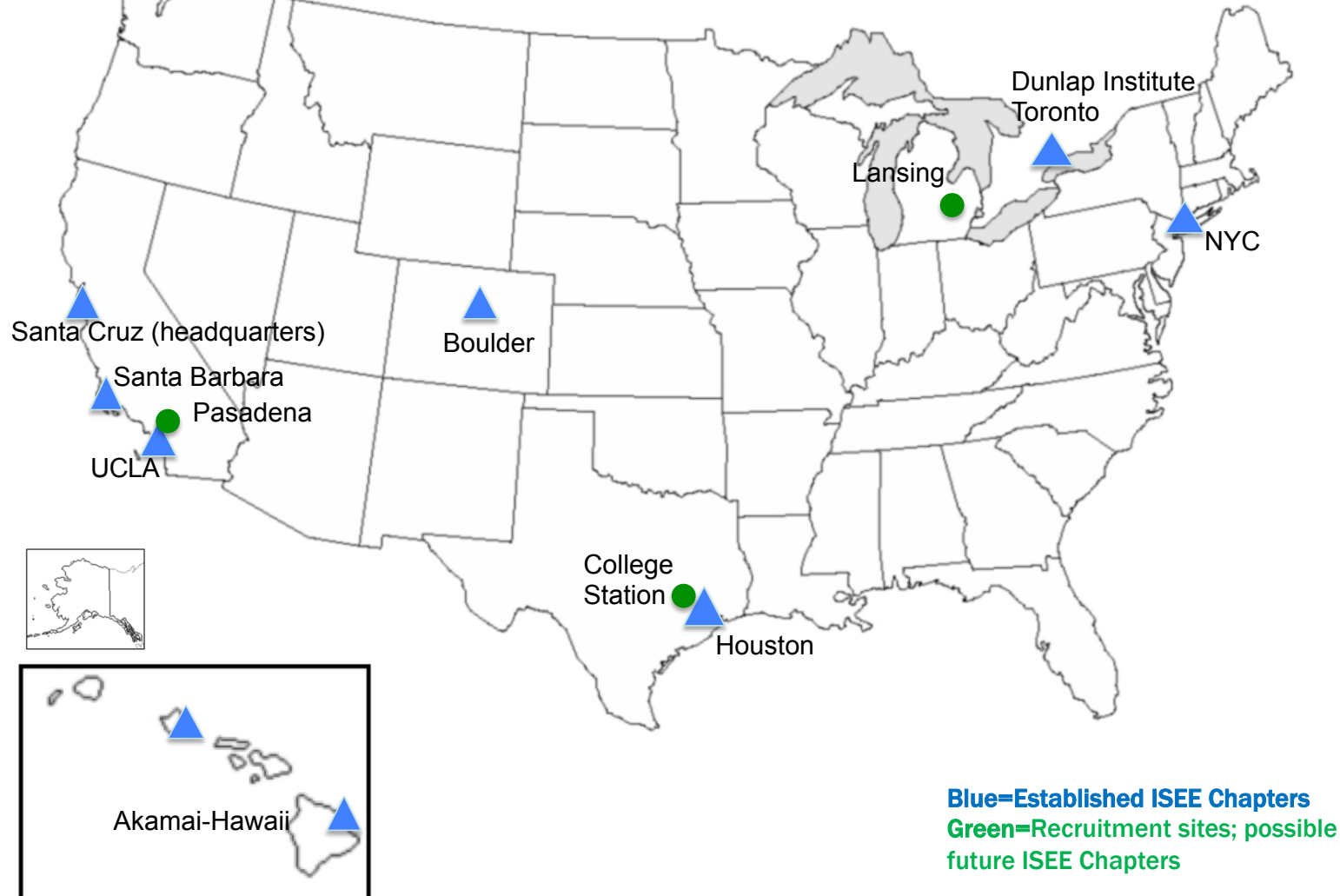
ISEE is developing an international program for TMT

ISEE programs can be used, and adapted to meet  
the workforce needs of TMT

<http://isee.ucsc.edu>

# ISEE is a National Program Devoted to STEM Workforce Development

## Current ISEE Chapters





Two major program areas developed by  
CfAO and now run by ISEE:

Professional development for graduate  
students and postdocs

(9 alumni at this meeting!)

Undergraduate Internship (“Akamai”)

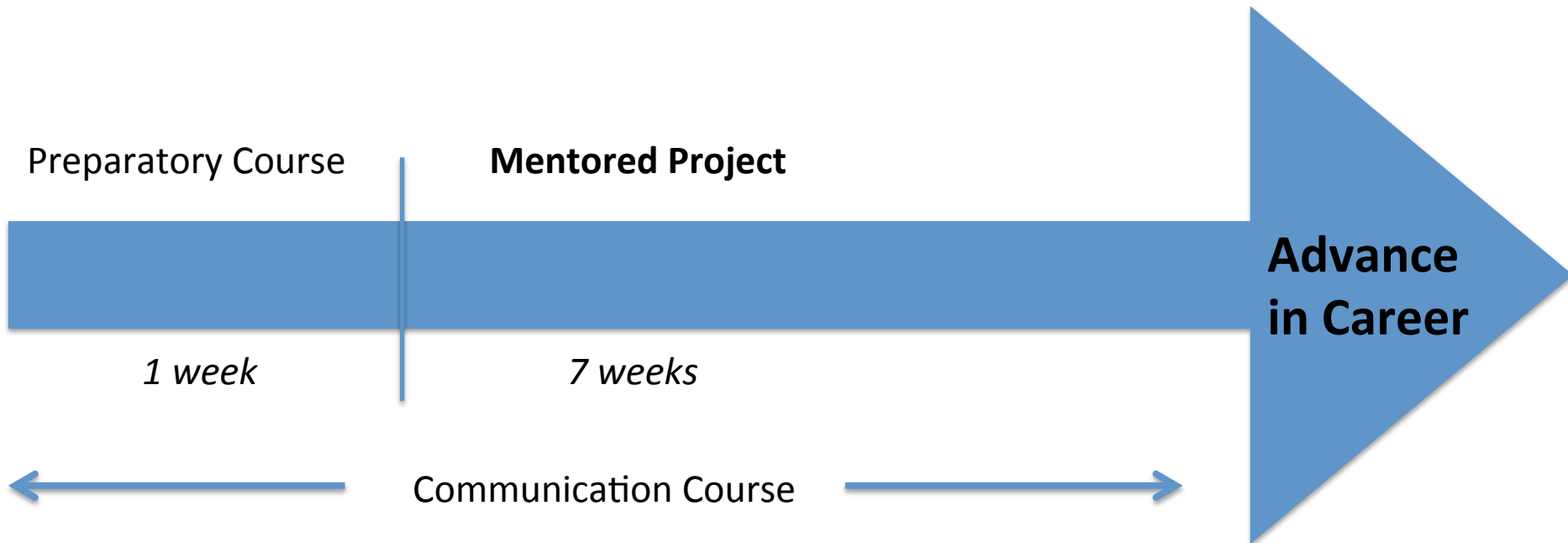
Two major program areas developed by  
CfAO and now run by ISEE:

Professional development program for graduate  
Students and postdocs

Undergraduate Internship (“Akamai”):  
Advancing Hawaii college students into  
observatory and other jobs. TMT now a  
major funder of Akamai

# Akamai Internship Program

Summer experience for Hawaii college students



Student participants (all from Hawaii):

- 23% Native Hawaiian
- 52% Underrepresented minorities
- 41% Women



# Akamai Interns Do Real Projects

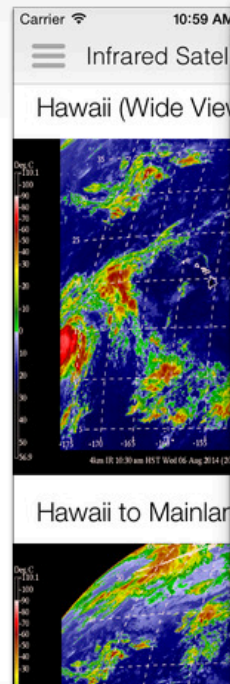
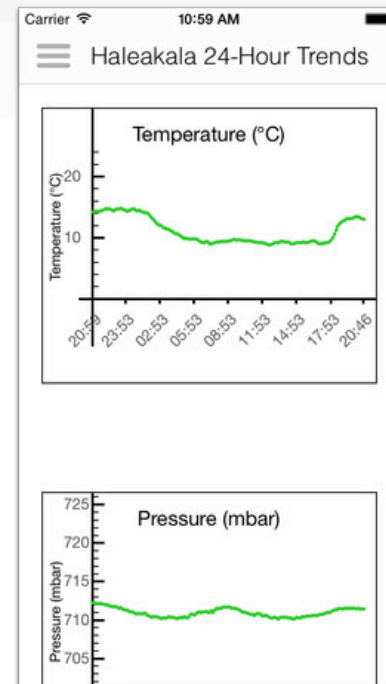
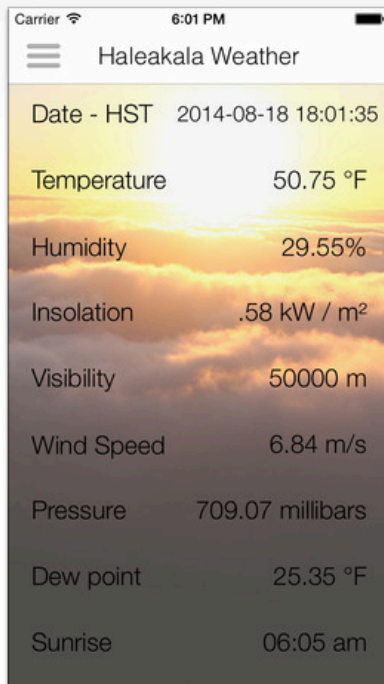
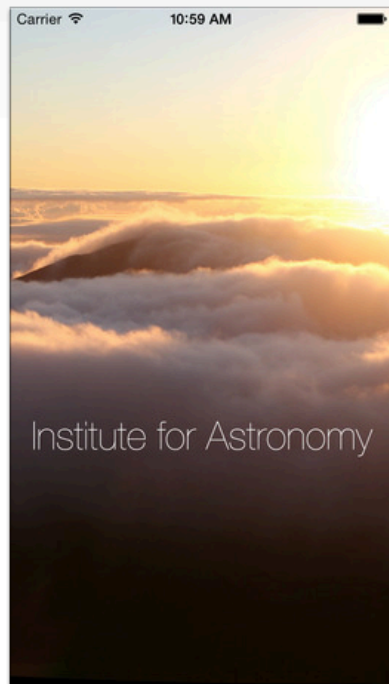
For example: Developing a weather App for Haleakala and Maunakea

IfA Weather 4+

Micah Lau >

Details Ratings and Reviews Related

## iPhone Screenshots



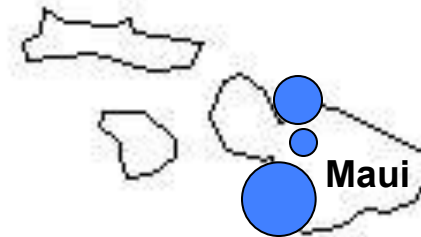
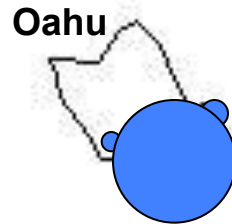
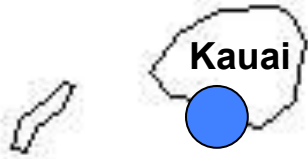
# Akamai Internship observatories and companies and number of interns hosted, 2003-2014

W.M. Keck Observatory	33
Institute for Astronomy, Maui	31
Gemini Observatory	27
Trex Enterprises	23
Akimeka	20
Smithsonian Submillimeter Array	20
Subaru Telescope	18
Institute for Astronomy, Hilo	15
Pacific Disaster Center	13
Oceanit	14
Textron Systems	11
Hnu Photonics	12
Canada France Hawaii Telescope	10

MHPCC	8
UH Hilo	9
Pacific Defense Solutions	6
<b>TMT International Observatory</b>	<b>6</b>
Boeing	4
PJITC/2C4	5
NELHA	5
Northrop Grumman	4
Big Island Abalone Farm	3
PISCES	2
UH Maui College	2
Makani Kai	2
Air Force Research Laboratory	2
Cellana	1

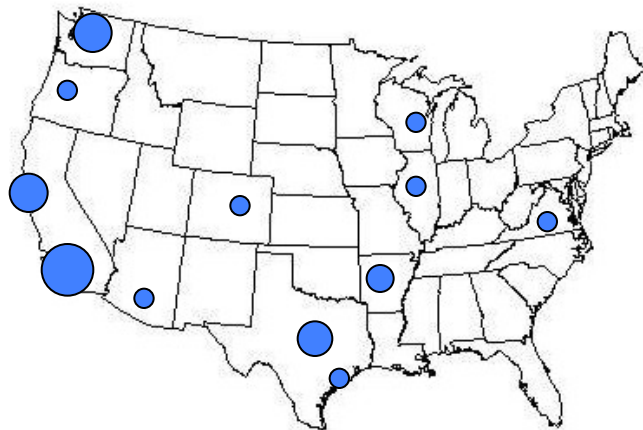
As of last week: 300 students

**80% persist in science and engineering**

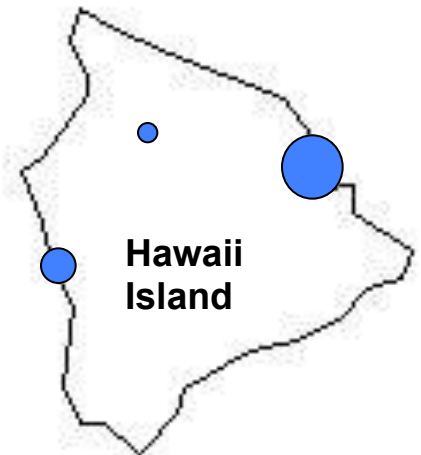


**At least 140 are now in STEM Jobs**

31 alumni on U.S mainland



2 alumni in international jobs





# Internships at Telescopes Open Opportunities

## Jobs at telescopes



Chriselle, from Maui, interned at the **IfA**, now works at **DKIST**

## Jobs in industry



Sean interned at **Keck**, now works as an engineer at **Pearl Harbor Shipyard**

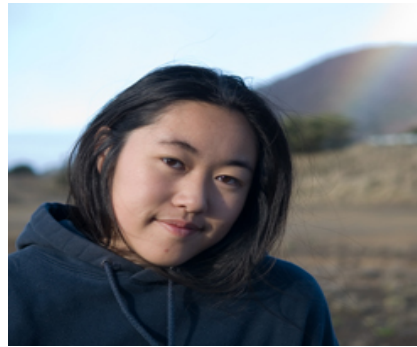
## Graduate school



Megan interned at **Gemini**, now a grad student in Astro at the **U of Hawaii**



Cy, from Kauai, interned at the **Keck**, now works as an electronic technician at **Gemini**



Amber interned at **CFHT**, and now work at **Hawaii Space Flight Lab**



Darcy, from Maui, interned at **TMT**, now is a grad student in EE at **U of Hawaii**

# Funding for Akamai

## Current:

Thirty Meter Telescope International Observatory

University of Hawaii system

Hawaii Community Foundation (THINK Fund)

NSF AST-1347767

National Solar Observatory

TMT has  
become major  
funder &  
participant



## Past:

AFOSR(FA9550-10-1-0044)

AFOSR (via NSF AST-0710699)

NSF AST-0836053

NSF AST-0850532

NSF AST-0710699

NSF Science and Technology Center program: CfAO, AST-9876783

<https://akamaihawaii.org>

# AKAMAI

## Fact Sheet



## Outcomes from 13 Years of Partnering with Telescopes

### **The Akamai Internship Program**

The Akamai Internship Program provides college students with summer projects at observatories and companies in Hawai'i. The goal of the program is to advance local students into the science, technology, engineering and mathematics (STEM) workforce, and increase the participation of underrepresented groups in STEM. Akamai uses a unique model that enables the current workforce to train the next generation with the skills and experience to be successful

### **265 college students from Hawaii have participated in Akamai**

Akamai accepts college students from Hawaii (80% graduated from a Hawaii high school or born in Hawaii), and is committed to including students from groups underrepresented and/or under-served in STEM. Demographics of Akamai alumni:

41% Women

52% Underrepresented Minority

23% Native Hawaiian

37% Community College

**At least 140 Akamai alumni are now in science or technology jobs**

# TMT International Training Program

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Undergraduates, Graduate Students, or Post-Docs

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?

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Advance  
in Career  
and TMT

Components we can draw from:

- “Summer schools” (1-2 weeks)
- Internships
- Extended projects at TMT sites
- Workshops



# TMT's Current and Future Workforce

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Advance  
in Career  
and TMT

Instrument  
Teams

International  
Science  
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System  
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Business Groups

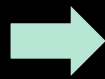
Legal Teams



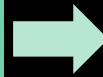
# Our process in 2015

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Identify  
TMT  
partners'  
interests  
and  
priorities



Outline  
preliminary  
design



Review by  
TMT  
Community



Propose a  
program  
design

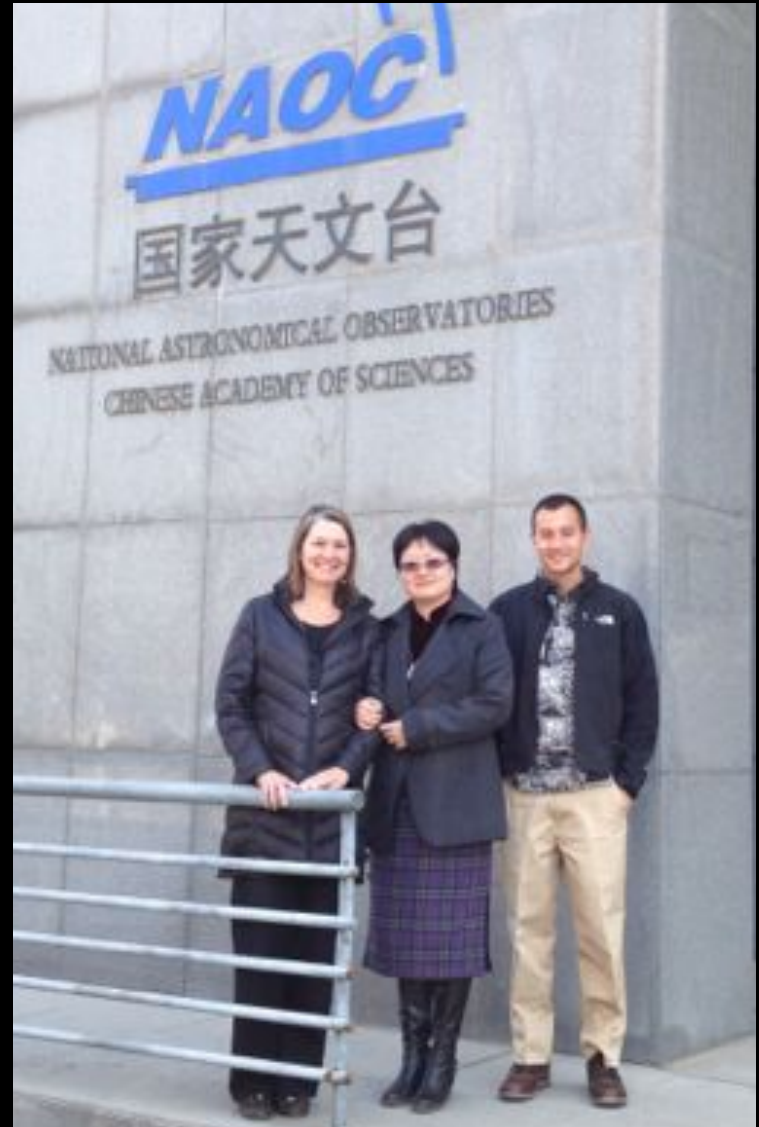
# Learning about TMT partners' interests

Meeting with TMT partners:

We've visited China

Currently scheduling trips  
to other partner sites

Good time for input!

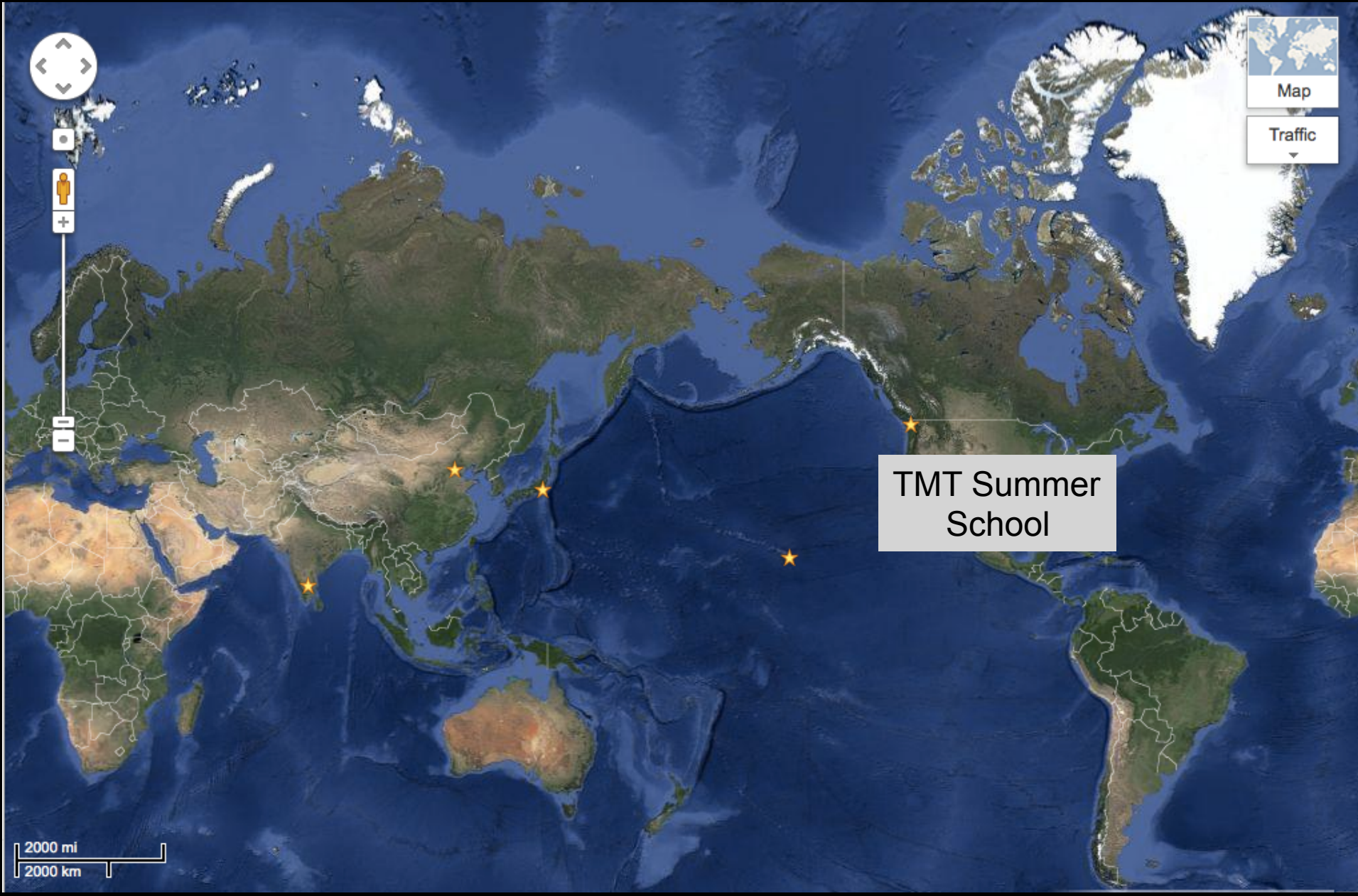


# **What we've learned so far**

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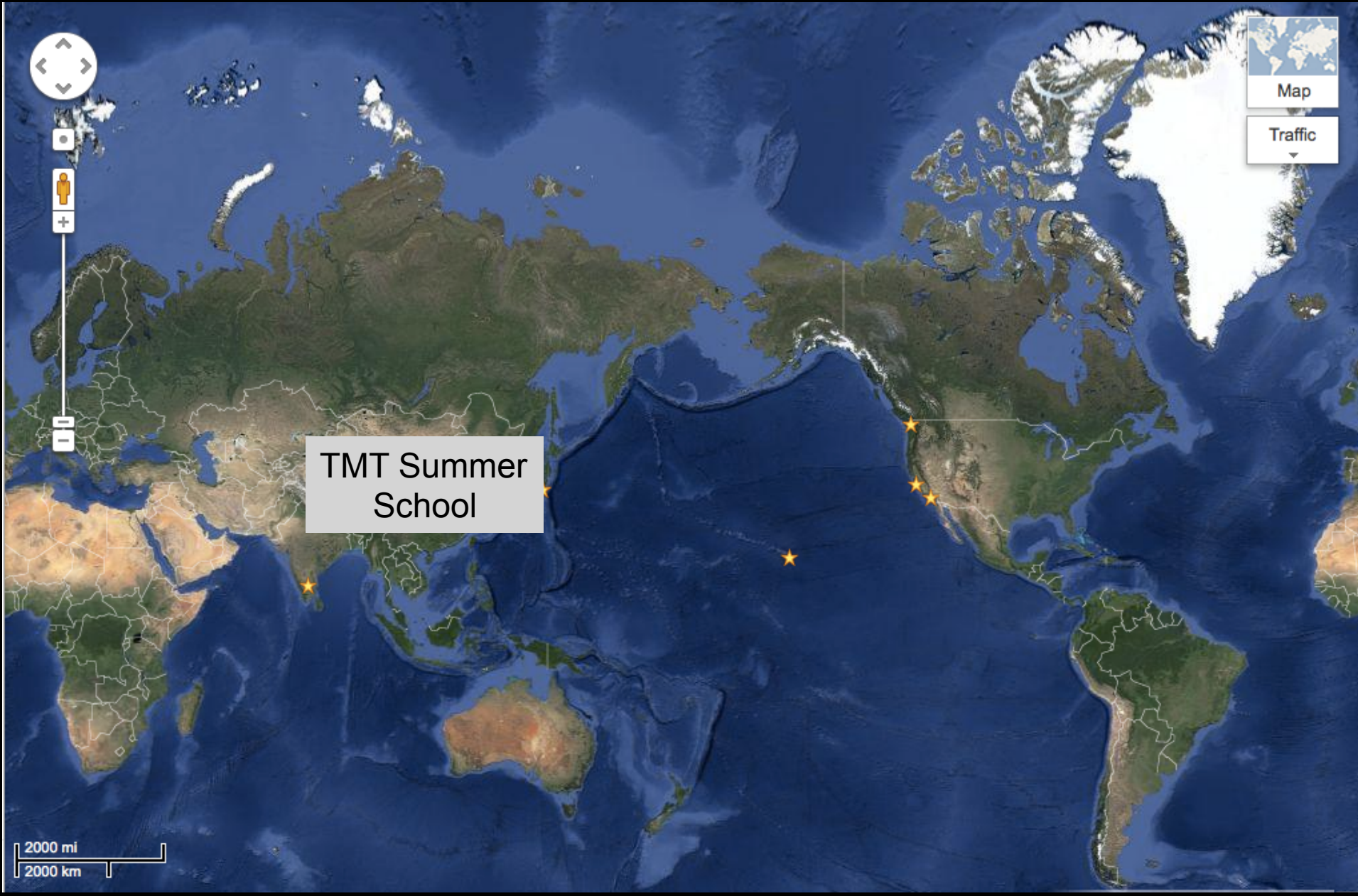
- **Lots of interest!**
- **Exchanges, internships, visits at TMT partner sites high priority**
- **There will need to be specific mechanisms in place to stimulate and facilitate**
- **Teamwork, leading teams, project management, working across cultures – highly desired skills**

# An Emerging Idea: TMT “summer school” that rotates among partners



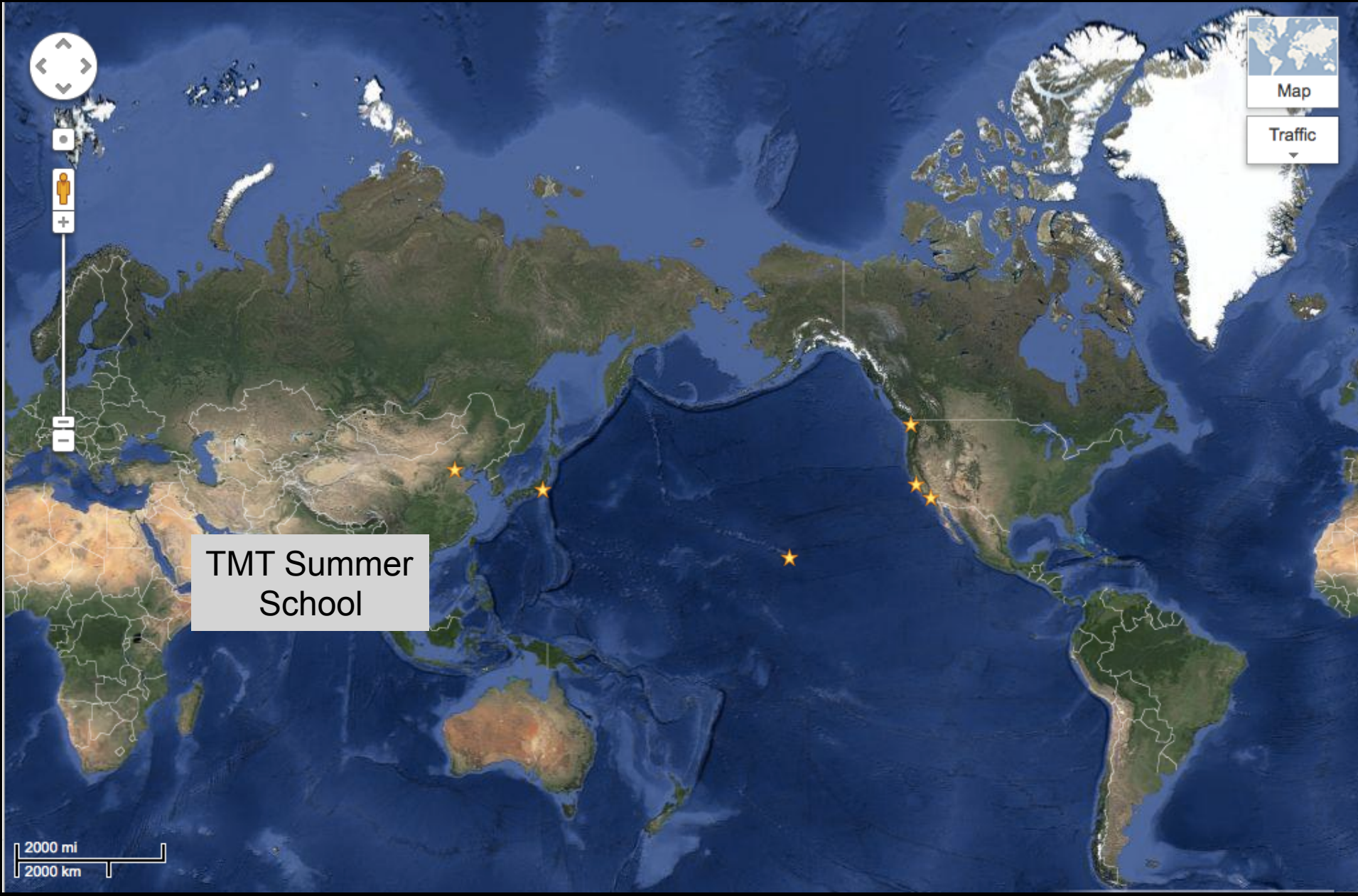


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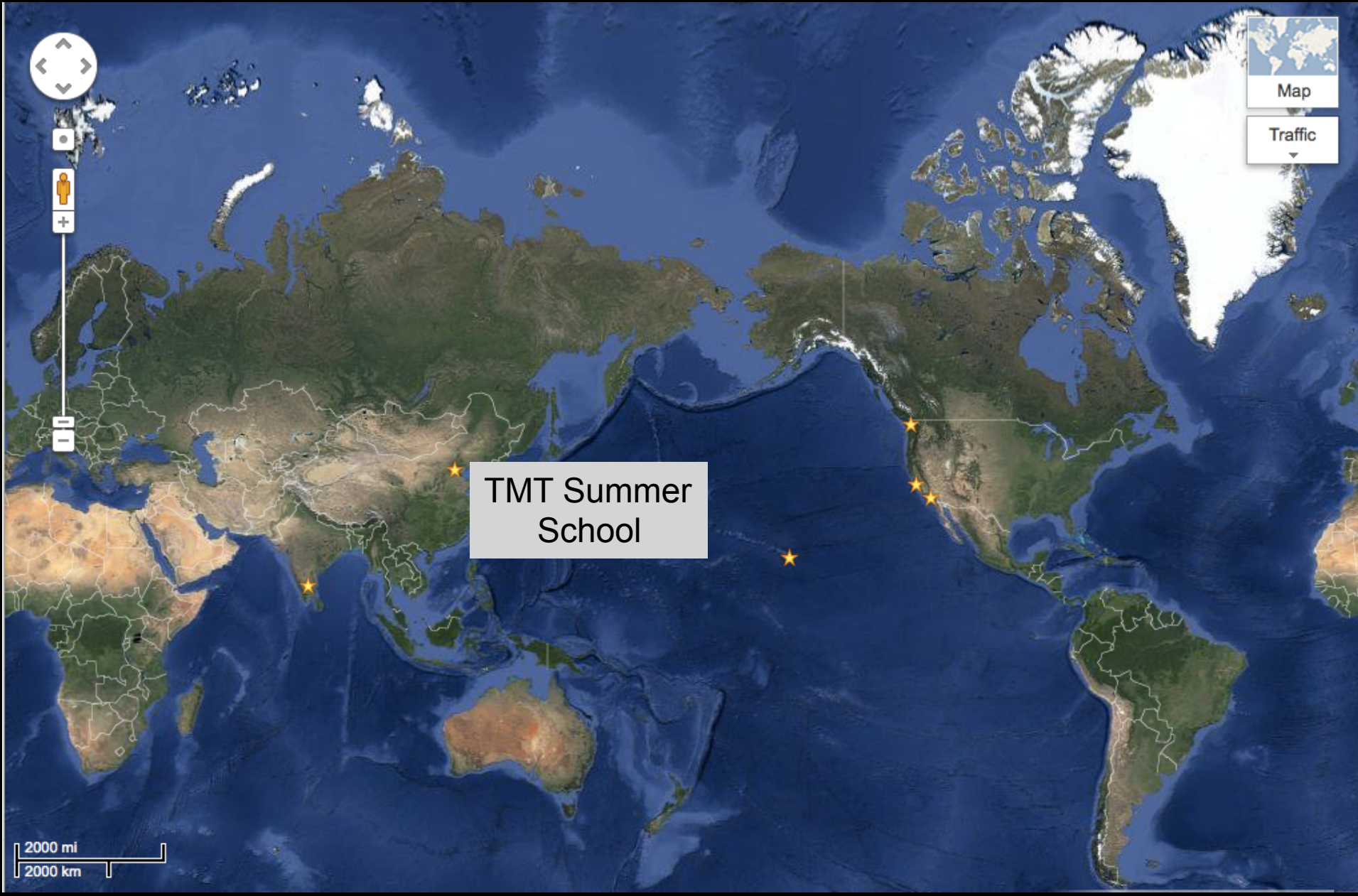


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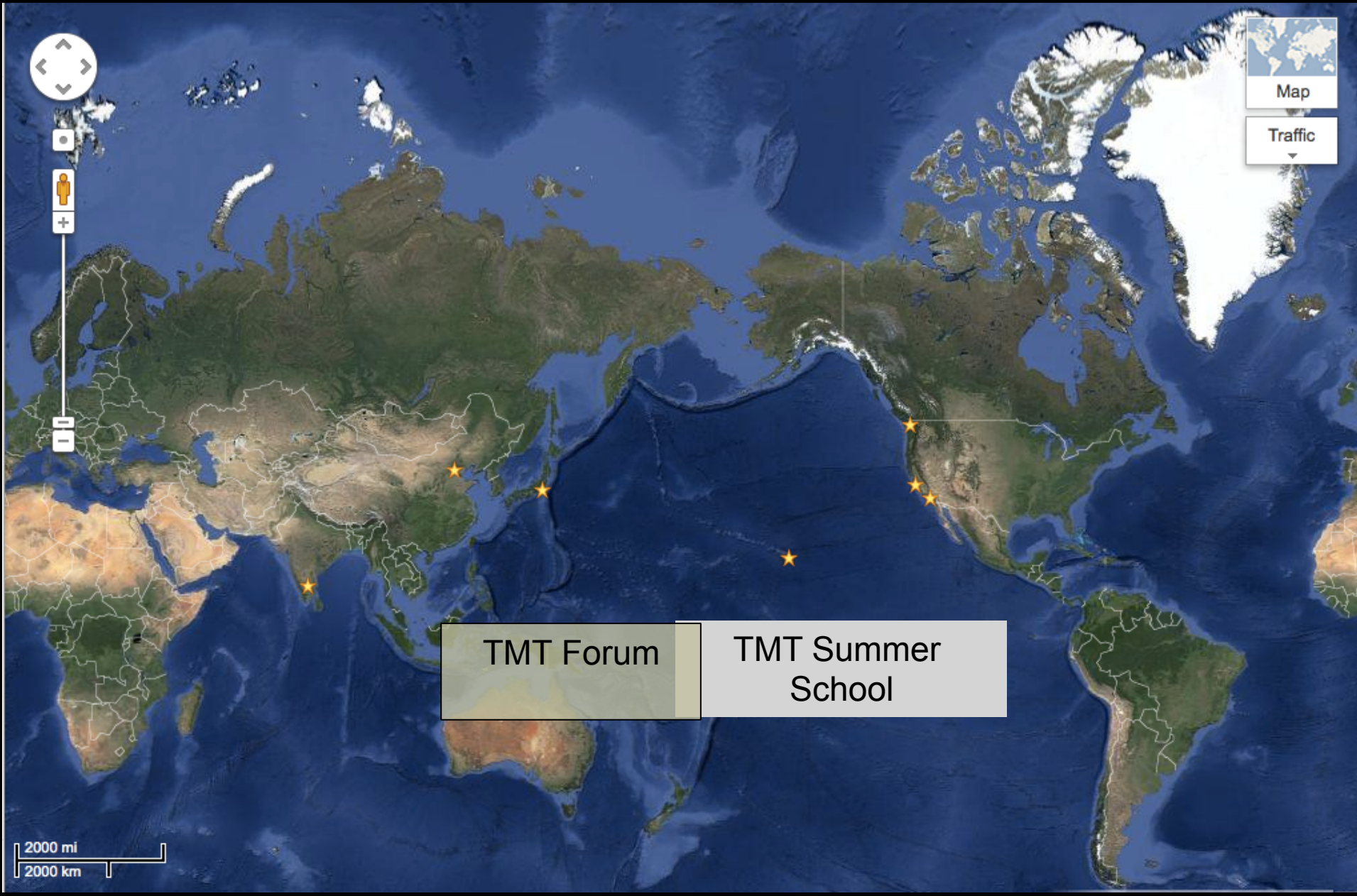
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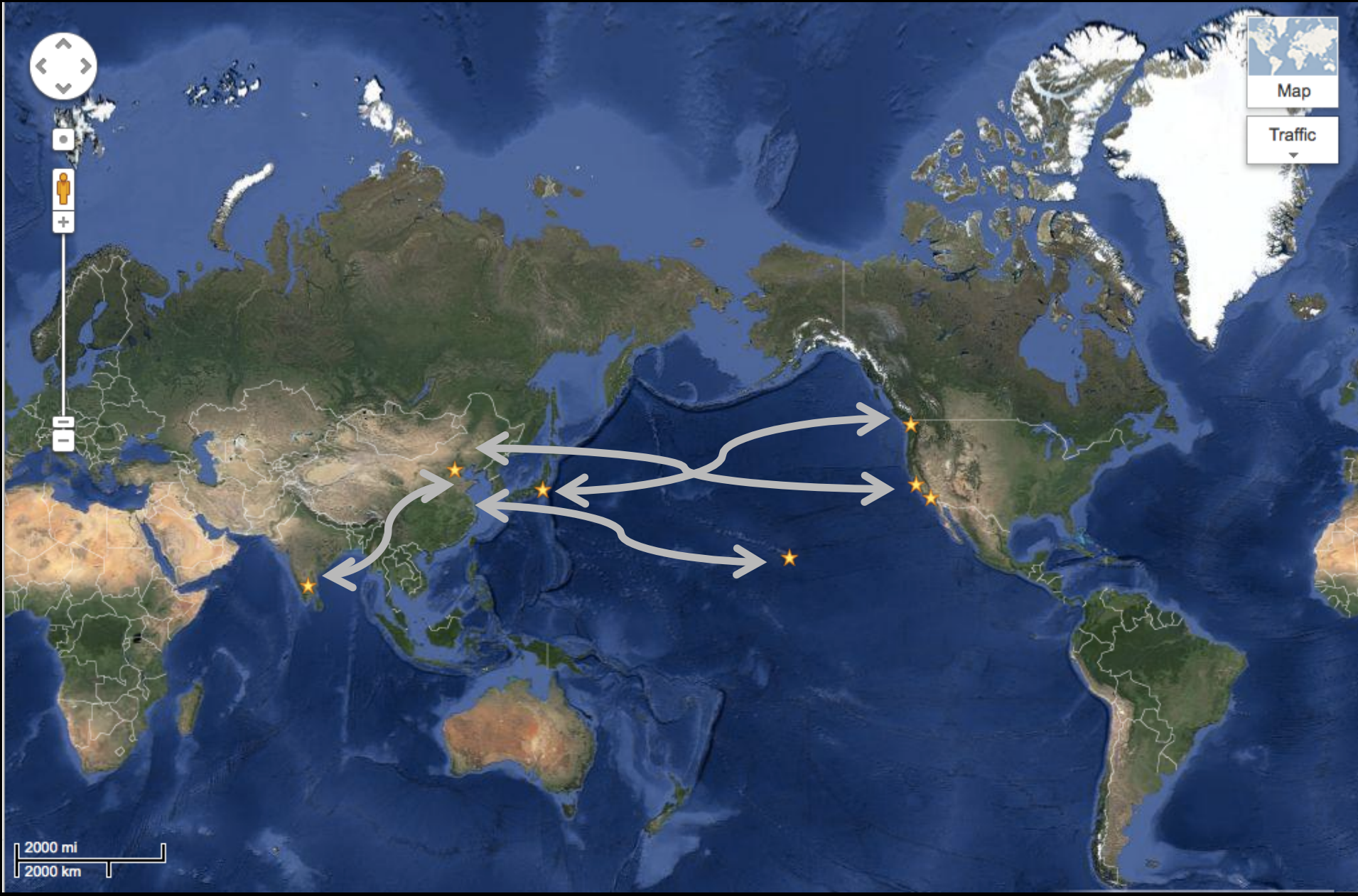
Another Idea:

TMT summer school that overlaps ~1 day with TMT Forum





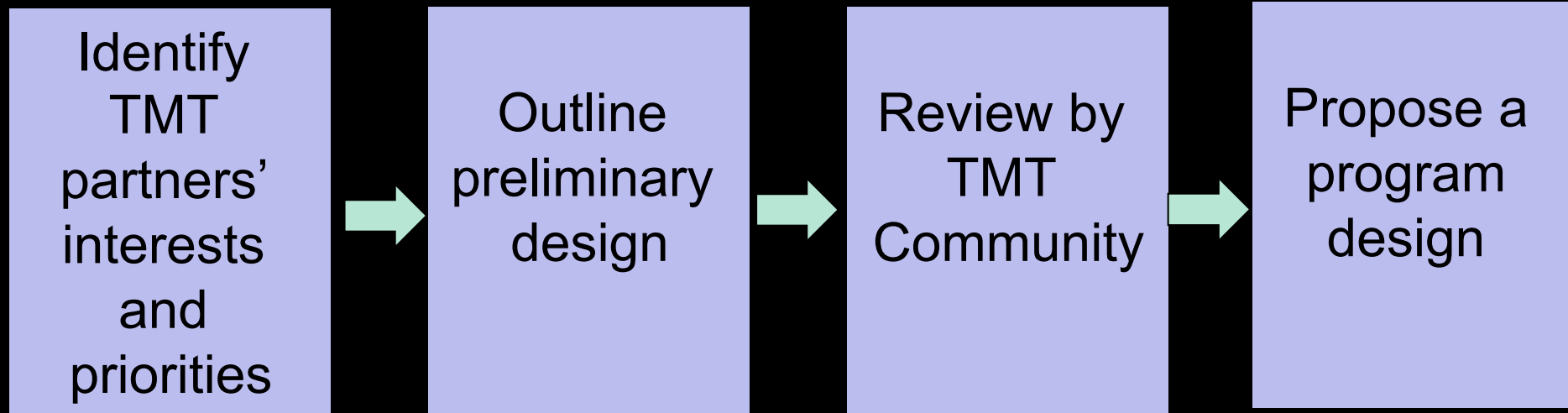
Summer school could be designed to stimulate collaborative projects, and grad students/postdoc projects at TMT sites



# Getting involved & giving feedback

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There is already a lot going on – we'd like to identify existing successful efforts



We're interested in your ideas, and we're arranging visits

<https://goo.gl/En2gRJ>