



National Astronomical Research
Institute of Thailand (Public Organization)
Ministry of Science and Technology of Thailand



NARIT



National Astronomical Research Institute of Thailand

Established since 1 January 2009
under the Ministry of Science and Technology



Mission

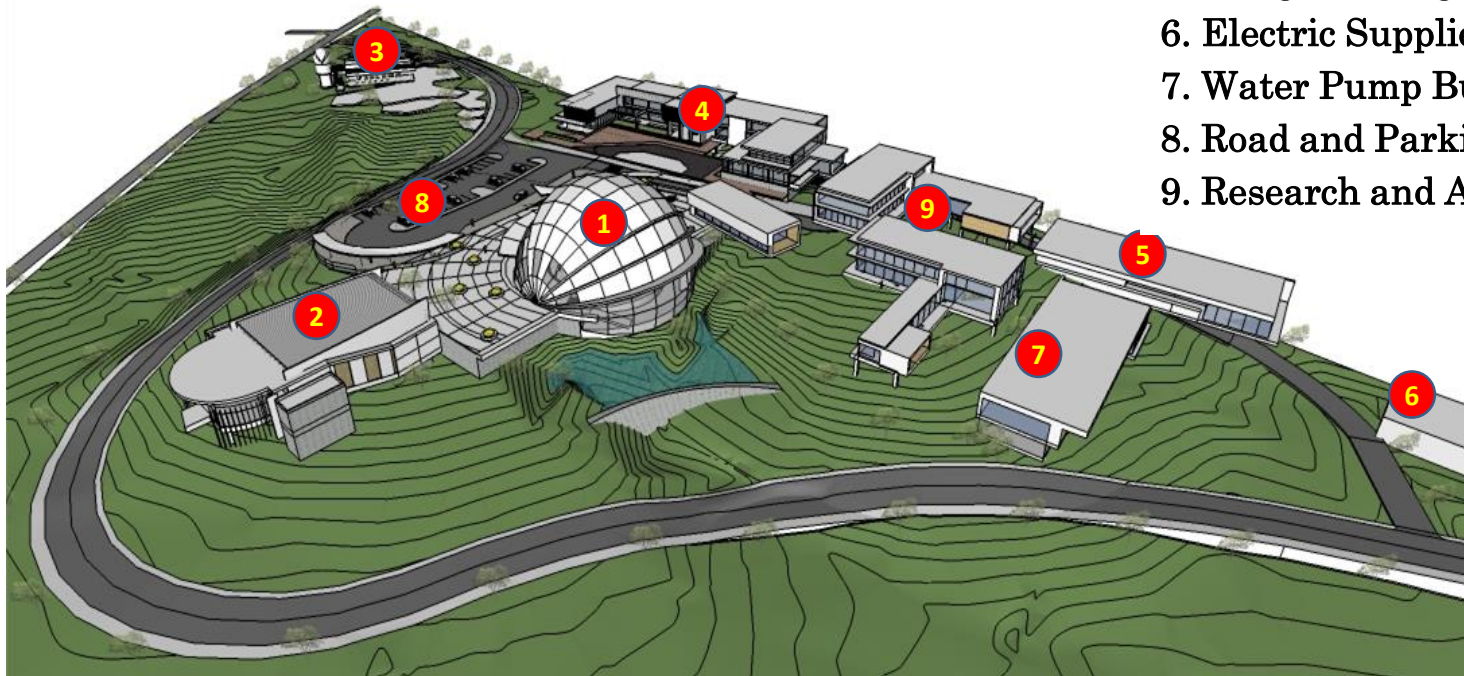
1. Conducting research in Astronomy and related fields including technology in Astronomy
1. Developing human resources and research infrastructures in Astronomy
1. Establishing international and national research and academic cooperation networks in Astronomy
1. Pursuing knowledge and technology transfer in the field of Astronomy



Princess Sirindhorn AstroPark, Chiang Mai, Thailand

Location: Don Kaew, Mae Rim, Chiang Mai (22 Acres)

1. Planetarium
2. Auditorium and Seminar Hall
3. Observatory
4. Main Office and Laboratories
5. Mechanical Workshop and Mirror Coating Building
6. Electric Supplies System Building
7. Water Pump Building
8. Road and Parking
9. Research and Academic Service Center





Princess Sirindhorn AstroPark, Chiang Mai, Thailand



Ground-breaking Ceremony, 9 July 2015
Permanent office, July 2017



NARIT's Network of Optical Telescopes



∅ 2.4 meters



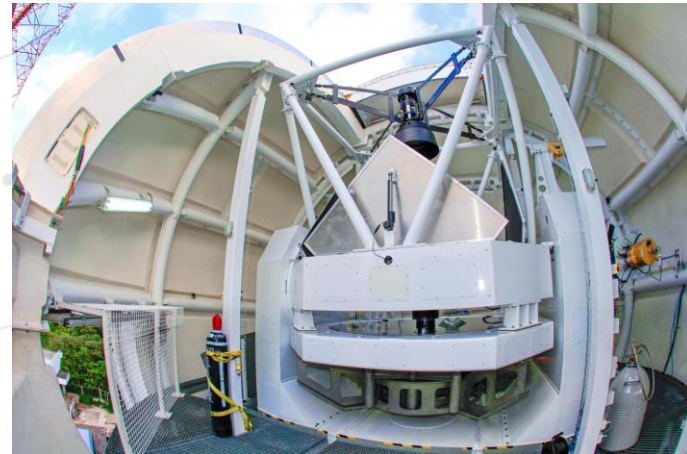
∅ 0.7 meters



Thai National Observatory, Chiang Mai, Thailand



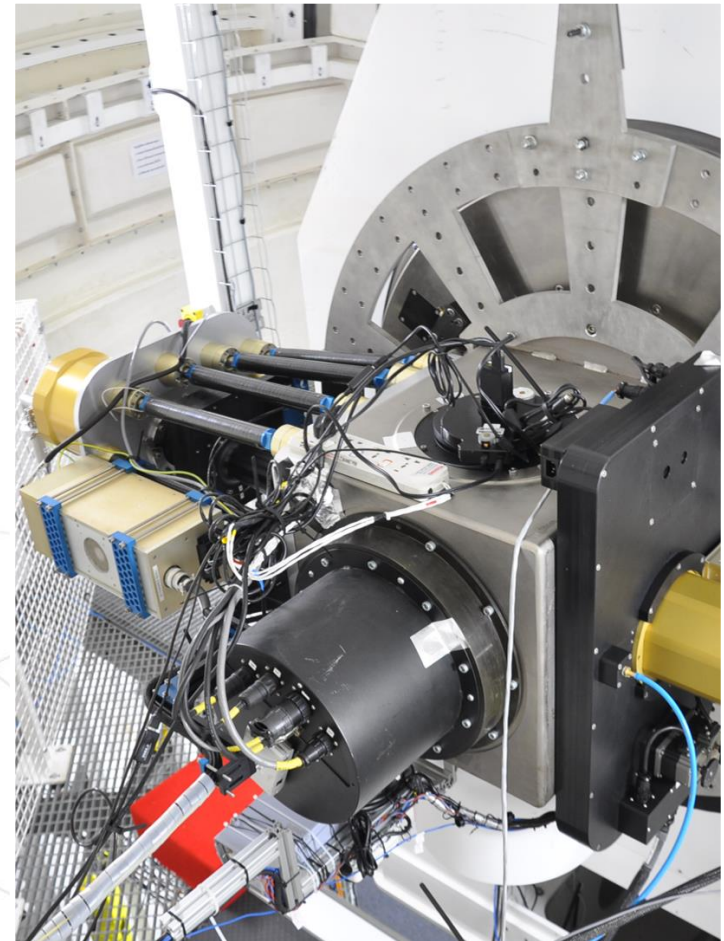
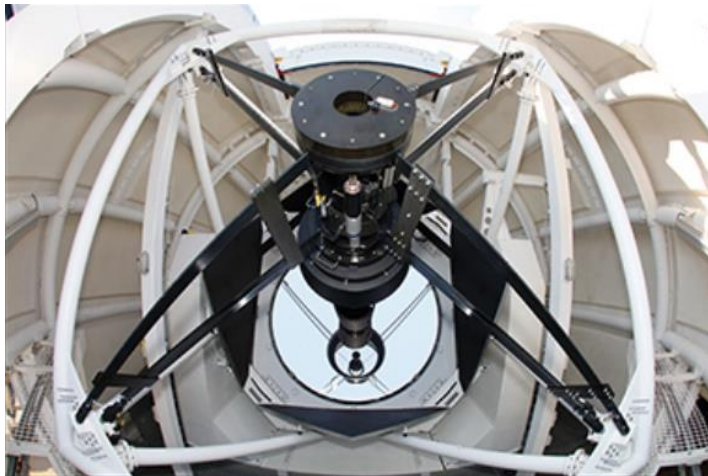
- Inaugurated in 2013
- Lat 18°34'25" N, Long 98°28'56" E
- 2,457 metres altitude
- Dry season (Oct-Apr)
- Doi Inthanon national park
- Median seeing 0.9 arcsec





Thai National Telescope

- 2.4 m-diameter telescope
 - Ritchey-Chretien, f/10
 - 2.3 m external clear aperture
 - Pointing accuracy 3 arcsec
 - Tracking accuracy 0.5 arcsec
 - Two Nasmyth foci
 - Nasmyth 1 with derotator, 4 ports





Thai National Telescope instruments

- The ULTRASPEC camera
 - $1\text{k} \times 1\text{k}$ EMCCD
 - FOV 7.7×7.7 arcmin
- The Medium Resolution Echelle Spectrograph (MRES)
 - Resolution $R \approx 15,000$
 - Spectral band 390-880 nm
- The 4K camera
 - $4\text{k} \times 4\text{k}$ CCD
 - FOV 8.8×8.8 arcmin
 - FOV 14.6×14.6 arcmin
focal reducer (2018?)





Thai Robotic Telescope Network

TRT-TNO

- 0.5 metre telescope
- Thai National Observatory, Thailand
- Lat 18°34'25" N, Long 98°28'56" E
- 2,457 metres altitude
- CCD Andor iKon-L 936 (2k × 2k)
- FOV 23.4 × 23.4 arcsec



TRT-AF

- 0.7 metre telescope for NEO and Space Debris Monitoring
- Royal Thai Air Force Report Center, Thailand
- Lat 18°35'24" N, Long 98°28'8" E
- 2,565 metres altitude
- CCD PeoLine PL16803 (4k × 4k)
- FOV 20.9 × 20.9 arcsec





Thai Robotic Telescope Network

TST (PROMPT-8)

- 0.6 metre telescope
- CTIO, Chile
- Lat $30^{\circ}10'11''$ S, Long $70^{\circ}48'23''$ W
- 2,201 metres altitude
- CCD Apogee U42 (2k \times 2k)
- FOV 22.6×22.6 arcsec



TRT-GAO

- 0.7 metre telescope
- Gao Mei Gu observatory, China
- Lat $26^{\circ}41'44''$ N, Long $105^{\circ}03'52''$ E
- 3,193 metres altitude
- CCD Andor Tech (2k \times 2k)
- FOV 20.9×20.9 arcsec





Thai Robotic Telescope Network

TRT-SRO

- 0.7 metre telescope
- Sierra remote observatory, USA
- Lat 37°04'13" N, Long 119°24'47" W
- 1,405 metres altitude
- CCD PeoLine PL16803 (4k × 4k)
- FOV 20.9 × 20.9 arcsec

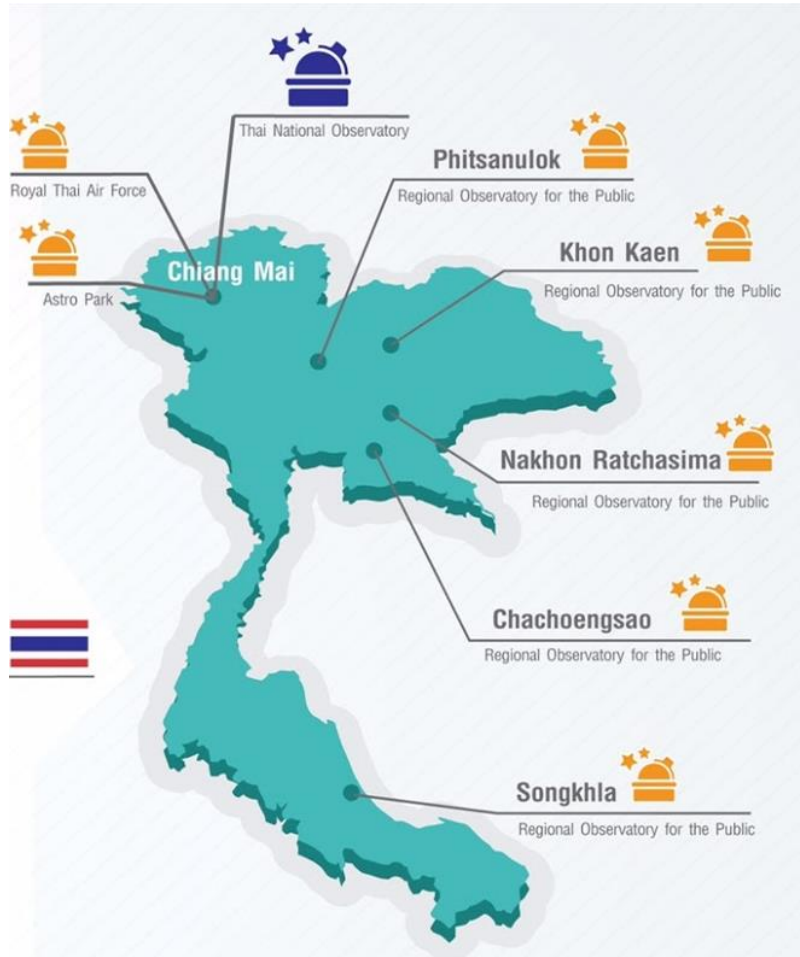


0.7 m telescope in Australia

- 0.7 metre telescope
- Siding Brook observatory, Australia
- 2018???



Observatories for Public



Nakhon Ratchasima



Chachoengsao





Thai National Radio Telescope

- Astronomy Network and Geodesy for Development (RANGD)
- 40-metre radio telescope
 - Chiang Mai, Thailand
 - Finished 2020???
 - Updated version of IGN's 40m Yebes Radio Telescope
 - Cassegrain-Nasmyth optics
 - Total surface accuracy $< 200 \mu\text{m}$
 - Slew: 3 m/s in Azimuth and 1 m/s in Vertical
 - Pointing accuracy: 2 arcsec (no wind) and 6 arcsec (5 m/s wind)
- 13-metre VGOS telescopes
 - VLBI Global Observing System
 - For a very precise plate tectonic measurement





High Performance Computer cluster



- 1 Management node (12 cores, 2.4 GHz Intel Xeon E5-26xx v3)
- 19 compute nodes (rack + Blade servers)
 - CPU 496 cores (@ 2.6GHz clock speed)
 - Memory 2.2TB (4 GB RAM per core)
 - Infiniband FDR 56Gbps interconnect
 - 2 Intel Xeon Phi Coprocessors (112 cores @ 1.2GHz)
- Storage: Lustre 90TB over IB FDR
- $R_{\text{peak}} = 22$ TeraFLOPS
- <http://chalawan.narit.or.th/>



Mechanical Workshop at NARIT

- Mirror Coating Facility



- High Precision Machining Lab (5 micron of guarantee in 2016)





NARIT's projects





Southeast Asia Regional Office of Astronomy for Development (SEA ROAD) of the IAU



Thailand has been appointed by the IAU in 2012 to host the SEA ROAD



The International Training Centre in Astronomy (ITCA) Under Auspices of the UNESCO





Astronomy in Antarctica

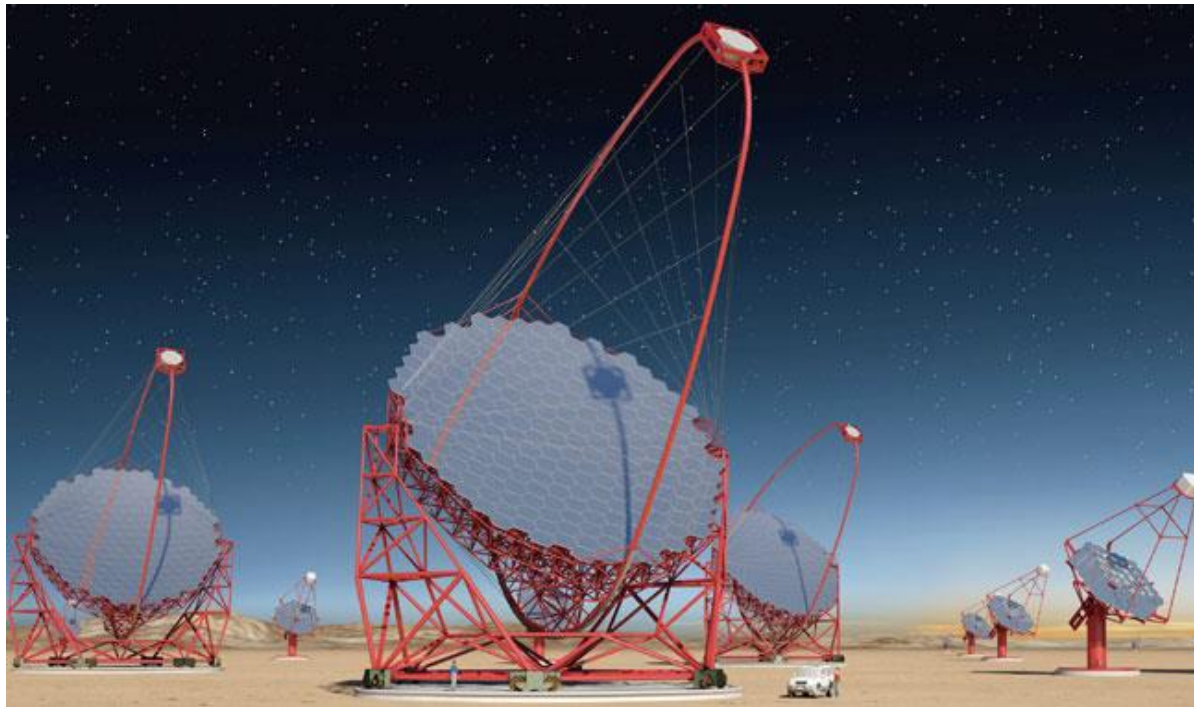
- Member of Scientific Committee on Antarctic Research (SCAR)
- Collaborated with Polar Research Institute of China (PRIC)





Astroparticle with Cherenkov Telescope Array (CTA)

- MoU Signing Ceremony between NARIT and DESY, 19 November 2015
- NARIT offers Mirror Coating Solution for CTA

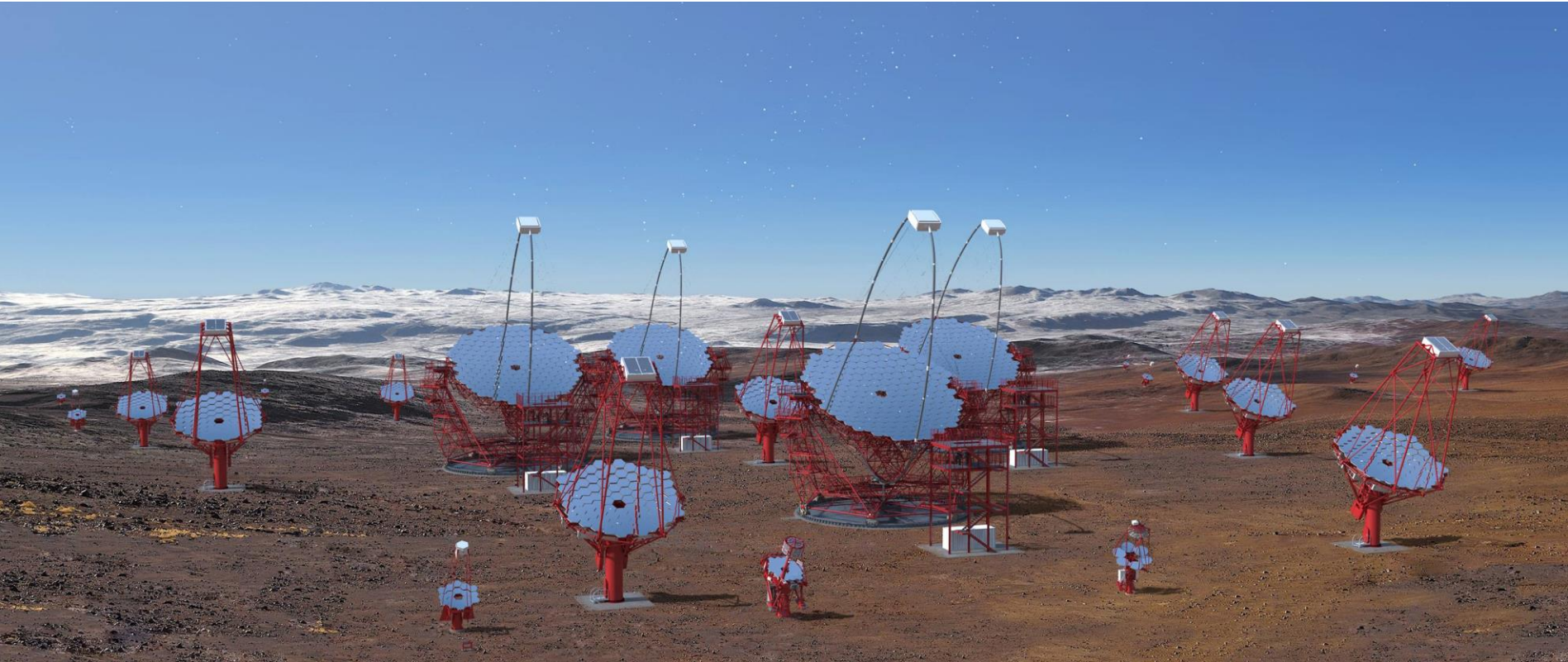




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NARIT





NARIT-ICRAR DFAT AAC grant 2016-2019

- Collaborated with the International Centre for Radio Astronomy Research, University of Western Australia
- Establishment and promotion of High Performance Computing for Astronomy in Thailand
- Australian – ASEAN Council (ACC) Grant round 2016-2017



International
Centre for
Radio
Astronomy
Research



Thai-JUNO (Jiangmen Underground Neutrinos Observatory) Collaboration

- JUNO Collaborative Meeting, SYSU, Zhuhai, China, 13-17 Feb 2017 (endorsed as a full member)
- NARIT and Thai JUNO consortium will contribute in EMF shielding coils design (crucial for overall detector performance)





STFC-NARIT collaboration through Newton fund





NARIT researchers

- 11 Researchers + 2 PostDocs
- Group expected to increase by ~2 researchers/year in next 5 years
- Binary stars, Variable stars, Astroseismology, Exoplanets, Young stars, AGNs, Cosmology, Pulsars, Trans-Neptunian Objects, Instruments, Atmosphere, History of Astronomy





David Mkrtichian

- Doppler tomography of atmospheres and asteroseismology of rapidly-oscillating magnetic (roAp) stars.
- Asteroseismology of mass-accreting pulsating components of Algols (oEA stars), spectroscopy of gas-flows and the mass-transfer activity cycles.
- Asteroseismology of exoplanet host A-type stars
- Exoplanet search in K-giants using precise radial velocities
- Exoplanet studies by transit method
- Classical variables (δ Sct, RR Lyr, δ Cep, etc.)

