Bureau International des Poids et Mesures

COOMET

UFFC
IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society

O'ZBEKISTON MILLIY METROLOGIYA INSTITUTI
UzNIM

BIPM-COOMET UTC
SUMMER SCHOOL

Jointly organized by the BIPM, COOMET TC4, UzNIM and kindly sponsored by IEEE UFFC

September 28 to 30, 2026, Tashkent, Uzbekistan

BIPM, COOMET TC4, O‘zMMI hamkorligida tashkil etilgan hamda IEEE UFFC tomonidan homiylik qilingan

2026-yil 28-30 Sentabr, Toshkent, O‘zbekiston

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TIME
FREQUENCY
SCIENCE
A MORE PRECISE
TOMORROW

Ulugh Beg Observatory

BIPM-COOMET UTC SUMMER SCHOOL

Overview

This summer school will cover key topics through tutorial lectures with an emphasis on Q&A in UTC, UTC(k), GNSS time transfer, atomic clocks, data analysis, and hands-on training sessions with analysis tools. Participants will gain practical experience in clock data analysis, generation of time scales, and time transfer techniques relevant to UTC(k) operations.

The summer school is planned on 3 days. The content of the training is tailored for skill development and knowledge sharing. It is scheduled in a way to help newcomers (engineers/scientists/technical staff) of time laboratories to get the complete knowledge to maintain their national time scale starting from analysing the clock data, realizing the time scale, and GNSS time transfer techniques, and participating to the international UTC.

The programme is planned that the participant shall get the complete knowledge about the subject and the hands-on training on the related aspects of UTC(k) generation using GNSS receivers and links. The summer school will use a combination of tutorials, hands-on work with analysis tools to help students develop expertise in understanding the basics as well as in-depth technical knowledge in UTC and UTC(k). Translation English to Russian, Russian to English will be provided.

Objective

The objective of this summer school is to support institutes in COOMET region and others regions to improve their national standard time and their contributions to Coordinated Universal Time (UTC) through participation in BIPM Circular T and by increasing knowledge in time and frequency metrology.

Programme highlights

Tutorials and presentation sessions:

- ✓ UTC computation and traceability
- ✓ UTC(k) realization and national distribution
- ✓ NTP dissemination services and automated monitoring
- ✓ Clock comparisons using GNSS
- ✓ Basics of time and frequency analysis
- ✓ Future outlook, optical clocks and redefinition of the second
- ✓ COOMET RMO best practices and innovative solutions.

Hands-on learning:

- ✓ Guided learning using BIPM e-learning tools: “Clock data analysis and visualization and clock data jumps”
- ✓ Guided learning using BIPM e-learning tools: “Processing of CGGTTS data”

Target audience

The school is intended for engineers, scientists, and technical staff at time laboratories who are new to, or actively participating in, UTC operations and who are responsible for maintaining national time scales. It’s intended also for staff from scientific laboratories and industries needing expertise in timing and synchronization.

Registration

Registration Information:

Registration for this event is open to professionals working in timekeeping and related fields, with no registration fee.

The school is limited to 20 participants. Priority will be given to applicants from COOMET regional metrology organization.

Travel Support: Travel assistance may be available for students with demonstrated financial need and relevance to their current role in timekeeping at their institution.

Venue and date

UzNIM, Uzbek National Institute of Metrology, Tashkent (Uzbekistan)

September 28-30, 2026

Sponsors

The school is jointly organized by the **BIPM**, **UzNIM**, and **COOMET TC4**.

The **IEEE UFFC** society is kindly sponsoring the student participation.

OPENING REMARKS



UZBEKISTAN AGENCY FOR TECHNICAL REGULATION

Akmal JUMANAZAROV

Director

Uzbek Agency for Technical Regulation under the Cabinet of Ministers

UZBEKISTAN AGENCY FOR TECHNICAL REGULATION

Lazizbek SAIDORIPOV

First Deputy Director

Uzbek Agency for Technical Regulation under the Cabinet of Ministers





O'ZBEKISTON MILLIY METROLOGIYA INSTITUTI

Sheroz ISMATULLAEV

Director

Uzbek National Institute of Metrology

Lectors

Bureau International des Poids et Mesures



Patrizia Tavella

Patrizia TAVELLA, degree in Physics and PhD in Metrology, is the Director of the Time Department of the Bureau International des Poids et Mesures, after 30 years at the Italian Metrology Institute INRIM. Her main interests are mathematical and statistical models applied to atomic time scales. She was deeply involved in the development of the European Navigation System Galileo.
In 2025, she received the Rabi Award from the IEEE Ultrasonics, Ferroelectrics and Frequency Control Society for excellence in leadership in the coordination and realization of UTC and advances in the statistics of precise timekeeping.



Aurelie Harmegnies

Ms Aurélie Harmegnies is an Assistant at the International Bureau of Weights and Measures (BIPM). Her work focuses on the computation of Coordinated Universal Time (UTC), the international reference time scale, in collaboration with national metrology institutes and observatories worldwide. For the past 18 years, she has been responsible for the maintenance and development of the software used for UTC computation. She has also contributed to the development of the WebTAI portal (webtai.bipm.org) and related digital services within the BIPM Time Department.

Lectors

ВНИИФТРИ



Igor Norets

Head of Department and Scientific Keeper of the State Standard at FSUE “VNIIFTRI”, with more than 25 years of professional experience in the field of time and frequency metrology.
Since May 2023, he has served as Chair of COOMET TC 1.11 “Time and Frequency.”



Vitaliy Palchikov

Chief Researcher at FSUE “VNIIFTRI”, Doctor of Physical and Mathematical Sciences, Professor. His main research activities focus on quantum metrology, atomic spectroscopy, and atomic time and frequency standards. He actively participates in the international activities of FSUE “VNIIFTRI”.
Until 2022, he served as Chair of COOMET TC 1.11 “Time and Frequency.” He holds the honorary titles of “Honorary Metrologist” and “Honorary COOMET Metrologist” and is a laureate of the 2021 State Prize of the Government of the Russian Federation in Science and Technology

Lectors



Artem Karaush

Head of the National Time Scale Formation Laboratory at FSUE “VNIIFTRI”, Candidate of Technical Sciences, with 15 years of professional experience in the field of time and frequency metrology.
His professional interests include time-scale calculation and generation, as well as time comparisons using GNSS signals. He actively participates in international activities and cooperation with the Time Department of the BIPM, ITU-R Study Group 7A, and the COOMET Time and Frequency Committee.



Calvin Lin

Calvin S.Y. Lin was born in Taipei; he earned a Bachelor of Science in Physics in 1990 and a Master of Science in Astrophysics in 1994 from National Central University in Taiwan. He subsequently joined the National Standard Time and Frequency Laboratory of Taiwan (TL) as a researcher, a position he has held ever since. His primary responsibilities include maintaining the national standard time and frequency, conducting research on the national time scale, and performing satellite time comparison and calibration. His current research interests encompass time scale algorithms, satellite time and frequency transmission, local time dissemination systems, and high-precision time and frequency measurements. Additionally, he serves as a member of the CCTF Working Group on GNSS, the Working Group on TWSTFT, and the International GNSS Service Clock Products Working Group.

Lectors



Bharath Vattikonda

Dr. Bharath Vattikonda is Principal Scientist in the Time and Frequency Metrology Division of CSIR–National Physical Laboratory, New Delhi, the National Metrology Institute of India, where he has worked on the realization and dissemination of Indian Standard Time since 2012. He holds a Ph.D. for the development of a laser-cooled, optically pumped Cesium fountain clock, and carried out the systematic uncertainty evaluation of India's primary frequency standard, NPLI–CsF1.
In 2023–2024 he served a one-year secondment to the BIPM Time Department, Paris, as Capacity Building and Knowledge Transfer (CBKT) Coordinator, authoring five e-learning courses. He contributes to the CCTF working groups on GNSS and TWSTFT, convened the BIPM–APMP Timescale Workshop 2024 in New Delhi, and has lectured at the BIPM UTC Summer Schools at CENAM, Mexico and at the BIPM, Paris.



Assaf Alassaf

Assaf Alassaf is a Time and Frequency Metrologist at the SASO National Measurement and Calibration Center (SASO-NMCC), Saudi Arabia, specializing in atomic timekeeping, time-scale generation, remote clock steering, GNSS time transfer, and measurement uncertainty evaluation. His research interests also include quantum metrology and quantum sensors, with a focus on advanced techniques for precision measurement and the development of national time and frequency infrastructure.
He is a recipient of the Best Graduation Project Award from Qassim University (2024) and the Best Senior Design Award from the American Nuclear Society (2026), and received an Early Career Sponsorship for CPEM 2026.

Lectors

КАЗСТАНДАРТ



Sultanbek Smagulov

Sultanbek B. Smagulov is Chief Specialist of the Time and Frequency Laboratory at KazStandard RSE, Kazakhstan. He has been working in metrology since 2018 and is responsible for Kazakhstan's National Primary Standard of Time, Frequency and National Time Scale.
His research focuses on the formation and steering of national atomic time scales, particularly UTC(KZ) using passive hydrogen masers. He developed an automated steering algorithm for UTC(KZ) based on BIPM Rapid UTC data and has contributed to the development of the UTC(KZ) Monitor and TimeLink KZ software systems.
He is the author of 15 scientific publications and a laureate of the COOMET Best Young Metrologist competition. He is also a PhD candidate at Tomsk Polytechnic University.

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Lyubov Gazieva

Lyubov Gazieva is a highly experienced metrology professional with more than 38 years of experience. Throughout her career, she has made significant contributions to the development of metrological control and ensuring the accuracy of measurements.
In recognition of her long-standing and dedicated professional service and high level of expertise, she was awarded the "Dustlik" (Friendship) Order by the President of the Republic of Uzbekistan in 2025.
She is also a recipient of the honorary title "Honored Metrologist of COOMET", recognizing her contribution to the development of metrology and international cooperation within COOMET.

Lectors

O'ZBEKISTON MILLIY METROLOGIYA INSTITUTI





Sheroz Ismatullaev

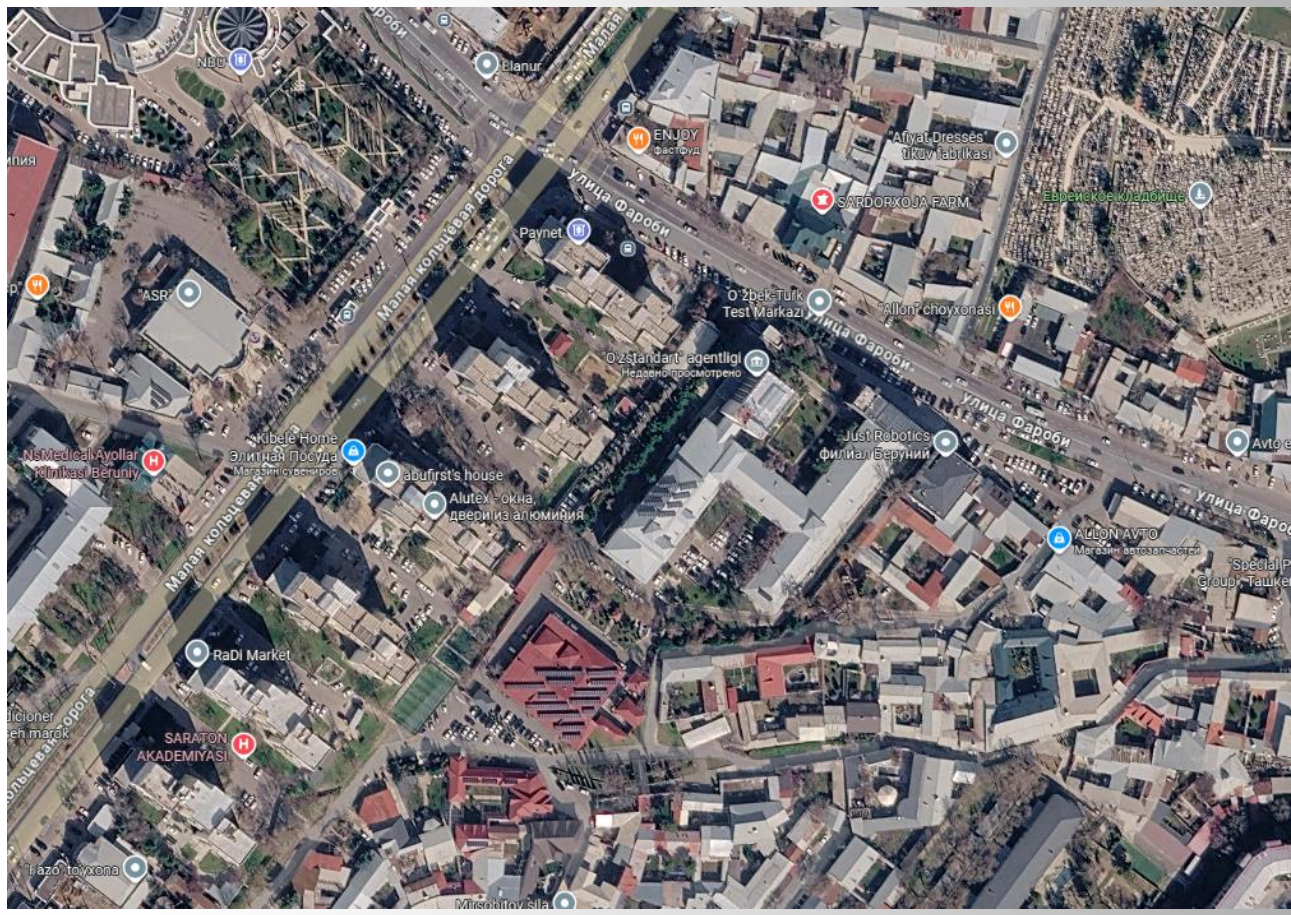
Sheroz Ismatullaev is the Director of the Uzbek National Institute of Metrology (UzNIM) and the Chair of COOMET Technical Committee 4 “Information and Training” (COOMET TC 4). He plays an active role in the development of Uzbekistan’s national metrology infrastructure and in strengthening international cooperation in the field of measurement science.
Under his coordination, the Time and Frequency Laboratory of UzNIM has been significantly developed, with a particular focus on establishing and strengthening national capabilities for the realization, dissemination and traceability of time and frequency measurements.
Sheroz Ismatullaev is currently pursuing his PhD in the field of time and frequency metrology, with research focused on ensuring metrological traceability of time and frequency measurements. His research addresses methods for establishing reliable traceability chains, improving measurement capabilities, and ensuring the accuracy and international comparability of time and frequency measurements.

Vohobjon Nishonov

Vohobjon Nishonov is a Chief Specialist at the Time and Frequency Laboratory of the UzNIM, with more than seven years of experience. He holds an academic background in metrology and standardization and is currently pursuing a PhD in the field.
His professional activities focus on UTC(k) realization, time-scale generation, GNSS-based time transfer, clock data analysis, and international time and frequency comparisons.
He is laureate for “The best report in English” of the COOMET Best Young Metrologist competition.
He was also awarded a commemorative badge on the occasion of the 35th anniversary of the Independence of the Republic of Uzbekistan for his contributions to the international recognition of Uzbekistan’s metrology achievements.

EVENT VENUE INFORMATION

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- Vohobjon Nishonov (v.nishonov@nim.uz)
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- Sheroz **ISMATULLAEV** (sh.ismatullaev@nim.uz; Calls/WA: +998-98-305-26-00)
- Ruslan **VALIEV** (r.valiev@nim.uz; Calls/WA: +998-98-444-70-88)

DRAFT AGENDA OF BIPM-COOMET UTC SUMMER SCHOOL

Time	Day 1 (28th September, Monday): UTC, UTC(k) realization and dissemination	Day 2 (29th September, Tuesday): Optical clock and redefinition of second	Day 3 (30th September, Wednesday): Data analysis
8:30	**Registration**	-	-
9:00	Summer School welcome		Hands-on use of CBKT analysis tools 1: Validating clock data format with BIPM convention (including the practice) - Bharath Vattikonda, NPLI; Patrizia Tavella, BIPM
9:15	The Coordinated Universal Time: the international time reference - Patrizia Tavella, BIPM	Intro Atomic Clocks - Vitaliy Palchikov, VNIIFTRI	
10:00	Contributing to UTC: input/output and requirements to realize UTC(k) - Aurelie Harmegnies, BIPM	Basic of time and frequency analysis: Allan Variance -Patrizia Tavella, BIPM	Clock Data Analysis (including the practice) - Bharath Vattikonda, NPLI
11:00	**Coffee break**	**Coffee break**	**Coffee break**
11:30	How UTC is computed: the Circular T behind the scenes – Aurelie Harmegnies, BIPM	Optical frequency references from the composition of GET 1-2022 – Vitaliy Palchikov, VNIIFTRI	CGGTTS Data Analysis - Bharath Vattikonda, NPLI
12:00	Example of UTC(k) realization and services to national industries of country: 1. National time scale UTC(SU) – Artem Karaush, VNIIFTRI 2. National time scale UTC(UZ) – Lyubov Gazieva, UzNIM	Overview of the activities towards the redefinition of the second and continuous UTC (CGPM draft resolutions) - Patrizia Tavella, BIPM	Practice for participants (30 min) - Bharath Vattikonda, NPLI
13:00	**Lunch**	**Lunch**	**Lunch**
14:00	Time Scale Ensembles and Remote Steering - Assaf Alassaf, SASO Automatized Control System for UTC(KZ) Realization and Data Submission to BIPM – Sultanbek Smagulov, KazStandard	GNSS measurement GNSS time transfer techniques - Calvin Lin, Chungwa Telecom	Open discussion with users 1. Time and frequency service in Uzbekistan Sheroz Ismatullaev, UzNIM 2. BIPM International Coordination Patrizia Tavella, BIPM 3. Time users and services in India Bharath Vattikonda, NPLI 4. State Service for Time, Frequency and Determination of Earth Rotation Parameters (Russian Federation): structure, composition, tasks, and provision of services to domestic users – Igor Norets, VNIIFTRI
15:00	NTP/PTP dissemination Bharath Vattikonda, NPLI		
15:30	CMC publication process in the field of time and frequency (uncertainty assessment) – Vohobjon Nishonov, UzNIM	Comparison of the National Time Scale UTC(SU) with remote time scales using GNSS signals – Artem Karaush, VNIIFTRI	Questions and discussions from users
16:00	**Coffee break**	**Coffee break**	**Coffee break**
16:30	1 slide/1 min by each student with UTC(k) scheme, question, request	GNSS receiver calibration - Calvin Lin, Chungwa Telecom	Closing ceremony and presentation of certificates
17:00		Planned practical work - Calvin Lin, Chungwa Telecom	
18:00	**Lab tour to UzNIM labs:** **1. Group 1 lead by Vohobjon Nishonov** **2. Group 2 Lead by Khojiakbar Rakhimov**	**Closing the Day**	**City tour to Tashkent**
19:00	**Closing the Day**	**Gala Dinner**	