

Announcement of the ESHG course Translational Epigenetics in Precision Medicine

October 18-21, 2025

Holiday Inn

Telavi, Georgia





Organizers: Tbilisi State Medical University Georgian Society of Medical Genetics and Epigenetics

The aim of the course is:

to train participants in the fundamental aspects of epigenetic mechanisms and their dysregulation in human diseases, with a focus on recent genome-wide technological advances and clinical applications in diagnostics and epigenome therapeutics.

This includes:

- Understanding basic concepts and mechanisms of epigenetics (e.g., DNA methylation, histone modifications, non-coding RNA).
- Exploring the role of epigenetic changes in cancer, rare diseases, and complex multifactorial conditions.
- Gaining hands-on experience through workshops in computational analysis, CRISPR editing, and AI-driven phenotyping.
- Discussing the use of epigenetics as preventive, diagnostic, and therapeutic tools in modern medicine.

The course blends lectures, clinical case discussions, and workshops to support translational understanding and practice in epigenetics

Course Directors:

Eka Kvaratskhelia, TSMU, Tbilisi, Georgia

Tinatin Tkemaladze, TSMU, Tbilisi, Georgia

Sofia Douzgou Houge, Haukeland University Hospital, Bergen, Norway

Local Organizing committee:

Elene Abzianidze, Nino Pirtskhelani, Ketevan Kankava

Venue: Holiday Inn; 2 Rustaveli Avenue, 2200 Telavi, Georgia

This hotel is located in Telavi, one of the prominent regions of Georgia, situated in the heart of Kakheti, the country's renowned winemaking area. Telavi is approximately 90 kilometers (56 miles) east of Tbilisi, the capital of Georgia. The journey typically takes around 1 hour and 30 minutes by car, depending on traffic and road conditions. Telavi offers a unique blend of traditional Georgian hospitality, culinary heritage, and stunning natural landscapes, making it an inspiring and memorable setting for the course.



Alvarado Sebastian, Queens College (CUNY), New York City, United States Banka Siddharth, Manchester University NHS Douzgos Houge Gunnar, University of Bergen, Norway Douzgou Houge Sofia, Haukeland University Hospital, Bergen, Norway Kankava Ketevan, Tbilisi State Medical University, Georgia Kvaratskhelia Eka, Tbilisi State Medical University, Georgia Michels Karin B., UCLA Fielding School of Public Health, Los Angeles, California, USA Pirtskhelani Nino, Tbilisi State Medical University, Georgia Tajerian Maral, Queens College (CUNY), New York City, United States Tkemaladze Tinatin, Tbilisi State Medical University, Georgia

Registration: Open from June 20, 2025 Registration fee: EUR500 (including tea, coffee, lunches, welcome dinner, gala dinner, wine tour) ESHG fellowships are available to cover registration ESHG fellowships application deadline: August 30

09.00-09.45	Opening remarks;
	Introduction in Epigenetics
09.45-10.30	Epigenetic mechanisms: DNA methylation and demethylation; histone
	modifications and nucleosomes
10.30-11.00	Coffee break
11.00-11.45	Epigenetic mechanisms: non coding RNAs: MicroRNAs, Piwi-interacting RNAs, Small interfering RNAs, Long ncRNAs
11.45-12.30	Mechanisms of chromatin remodeling, ATP-dependent chromatin remodeling,
	chromatin remodeling complexes
12.30-13.30	Lunch break
13.30-14.15	Genomic imprinting in mammals; Dosage compensation Epigenetic regulation in
	stem cells and cell reprogramming
14.15-15.00	Epigenetic epidemiology: Epigenetics in EWAS and DOHaD
15.00-15.30	Coffee break
15.30-16.30	Epigenetic inheritance: molecular mechanisms of transgenerational epigenetic
	inheritance
16.30-17.15	Workshop: Array-based and next generation sequencing (NGS)-based methods:
	Methyl-seq, ChIP-seq
17.15-18.00	Epigenetic programming of health and disease
18.00	Welcome Dinner

DAY 2

Cancer Epigenetics

09.00-09.45	Introduction to Cancer Epigenetics; Innovative epigenomic approaches in cancer diagnosis and treatment
09.45-10.30	Epigenetics drug design; Epigenetic therapy: DNA methyltransferases inhibitors; Histone deacetylase inhibitors (HDACi)
10.30-11.00	Coffee break
11.00-11.45	Workshop: CRISPR and epigenetic editing
11.45-12.30	The epigenetics of metastasis and cancer microenvironment
12.30-13.30	Lunch break
13.30-14.30	Genome-wide methylation profiling in diagnosis and prognosis of cancer
14.30-20.00	Going to Food and Wine tour

09.00-09.45	Genetics meets epigenetics in rare diseases; Mendelian diseases with epigenetic machinery: Disease Classification/Characterization
09.45-10.30	Clinical Case Discussion: Orchestrating genetics and epigenetics from a clinical perspective: lessons from Rubinstein-Taybi and Cornelia de Lange syndromes.
10.30-11.00	Coffee break
11.00-11.45	The epigenetics of dysmorphology: Overgrowth and growth restriction syndromes
11.45-12.30	Clinical Case Discussion: Peculiarities of inheritance pattern of Angelman synrome
12.30-13.30	Lunch break
13.30-14.15	Epigenetic Biomarkers in the Clinical Laboratory: Multi-omics techniques for the
	epigenetic analysis of rare diseases; The value of using episignatures in cases without diagnosis/VUS
14.15-15.00	Workshop: Artificial Intelligence Applied to Epigenetics; PhenoScore quantifies phenotypic variation for rare genetic diseases by combining facial analysis with other clinical features using a machine-learning framework
15.00-15.30	Coffee break
15.30-16.15	Peculiarities of inheritance pattern of Angelman synrome
16.15-17.00	Challenges and Future Perspectives: DNA methylation episignature for the
	intellectual developmental disorder
18.00	Gala Dinner

DAY 4

Environmental Epigenetics and Its Implication on common diseases

09.00-09.45	Genetics, epigenetics and environment; Environmental epigenomics and disease
	susceptibility; Aging and the epigenetic clock
09.45-10.30	Epigenetic mechanisms of brain plasticity in the context of peripheral trauma
10.30-11.00	Coffee break
11.00-11.45	Epigenetic regulation in metabolic diseases; Dietary bioactives: the potential to
	modify the aberrant Episignature
11.45-12.30	Epigenetics in complex diseases: Cardiovascular diseases
12.30-13.30	Lunch break
13.30-14.15	Nutritional Epigenetics; Toxin Exposures and Epigenetic Effects
14.15-15.00	Translational Epigenetics: rodent models for studying changes in epigenetic
	programming in response to stress and environment
15.00-15.30	Coffee break
15.30-16.15	Genome-wide epigenetic differences among twins: DNA methylation and histone
	acetylation of a large cohort of monozygotic twins.
16.15-17.15	Written test
17.15-18.00	Challenges and future perspectives; Closing remarks

Wine tour in Tsinandali Estate

Tsinandali Winery is located in the winegrowing region of Kakheti in Georgia, surrounded by panoramic settings and charming vineyards. Apart from making exceptional wines, the winery holds an in-house museum and an 18-hectare park. Guests can enjoy premium wine tasting in a beautiful setting. The estate also hosts exhibitions, music festivals, and scientific conferences. Explore the Tsinandali estate and its winery, picturesque gardens, wine cellars, hotel, and café. Some of the oldest vintages are stored in Princely Oenotheque historical for visitors to discover.





