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23

# ANNUAL REPORT

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ARMENIAN BIOINFORMATICS INSTITUTE

The Armenian Bioinformatics Institute (ABI) is a non-profit private foundation, launched in February of 2021 to support bioinformatics capacity building and the development of precision medicine and modern biotechnologies. This report summarizes the third year of our activities.

**Prepared by:**

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Karine Shahgaldyan (content)

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29 December 2023

ARMENIAN BIOINFORMATICS INSTITUTE  
Scientific Educational Foundation



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# 01

## INTRODUCTION

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# Empowering Armenia's Bioinformatics Landscape: A Year of Growth and Impact

Bioinformatics and genomics have crucial importance for the development of life sciences, biotechnologies and medicine in Armenia. In 2021, we conducted an assessment that underscored the escalating demand for bioinformatics specialists and the insufficiency of efforts to meet the growing demands of the human workforce. Fast-forward to 2023, and we've witnessed a significant surge in the requirement for bioinformaticians within both local and global pharmaceutical and biotechnology companies, as well as the clinical sector, particularly in the realm of genetic testing initiatives.

Addressing this burgeoning demand for human resources necessitates a strategic scaling effort. This motivated the establishment of the Armenian Bioinformatics Institute (ABI) as a scientific educational foundation in 2021. Our mission is to train bioinformatics specialists not only with technical expertise but also possessing leadership skills and values that will empower them to drive transformative changes in the biotechnology and biomedical sectors in Armenia.

The year 2023 marked several milestones for ABI. Through a concerted fundraising initiative, we successfully secured a high-performance compute node, backed by generous donations, infrastructure support and research grants, amounting to a substantial budget of nearly 60,000 USD. Currently, this node caters to the needs of approximately

30 researchers at ABI and the Institute of Molecular Biology National Academy of Sciences (IMB NAS) of the Republic of Armenia (RA), with plans for further expansion to support numerous research, educational and clinical projects across the country. Its primary function is to provide a secure and efficient platform for storing, sharing, and analyzing genomics datasets.

In 2023, we published several findings in the human and plant genomics and microbiome fields. We applied machine learning and other bioinformatics methodologies to explore the molecular pathomechanisms and treatment response heterogeneity of cancer subtypes. In another study, we identified new genetic determinants for adaptation of grapevine varieties to changing climate conditions. Finally, as a collaborator in a major study in Europe, we contributed to the development of a novel and rapid testing approach for antibiotic susceptibility.

This year, our partnerships with two prominent global biotechnology companies, based in the US and the UK, expanded within the realm of cancer precision medicine. Furthermore, a third collaboration, focusing on microbiome research, commenced towards the end of the year. These collaborations lay the foundation for the evolution of a modern and vibrant life sciences landscape in Armenia.

The invaluable support from our community has been pivotal in achieving goals we set for ourselves for 2023. Simultaneously, we

have made substantial progress towards self-sustainability, with grants and industry collaborations accounting for a significant portion of our expenses, surpassing the 300,000 USD mark in 2023.

Looking ahead, our objective for the coming years remains the development of sustainable human resource potential in the life sciences. For ABI as an organization, this entails a strategic balance between expanding research teams and the addition of senior staff to enhance efficiency and facilitate scaling.



# 2023 in Numbers



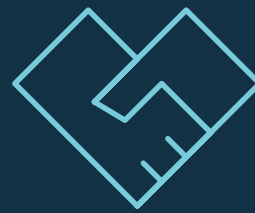
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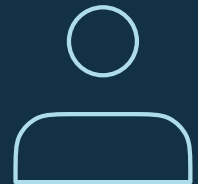
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8



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Students

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02

# INFRASTRUCTURE

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# Compute Node Acquisition

Genome bioinformatics involves handling large volumes of genomic sequencing data. This requires computational resources and infrastructure with substantial storage capacity, memory, and CPU cores. In 2022 we initiated a fundraising campaign to acquire a dedicated high-performance compute node that would not only serve ABI but also support other research, educational and clinical projects. With the backing of several grant funding agencies, as well as approximately 100 donor organizations and individuals via the ReArmenia platform, ABI successfully acquired a new compute node in 2023 and established a state-of-the-art genome bioinformatics computing infrastructure. Major organizations supporting this initiative included the Higher Education and Science Committee of the Republic of Armenia (through a development grant), FAST – the Foundation for Armenian Science and Technology (ADVANCE research grant), Flagship Pioneering Inc., SASTIC – Strategic Armenian Science & Technology Investment Community- (infrastructure support grant), SmartClick (donation), and many more.



Our new compute node is a 2x AMD EPYC 7702 (dual-socket 64 core) system with 2TB of memory and 240TB of storage, meeting the distinct space and memory requirements needed by our researchers at ABI. The node was acquired with the technical support of Alpha Engineering. In addition to infrastructure development, the campaign's success has allowed for the recruitment of a dedicated system administrator who has set up the node and data center and ensures its operational maintenance.

The server is meticulously maintained with over thirty individuals having access from both ABI and the IMB NAS RA. Our commitment is to not only maintain the current computing environment but

also to continuously improve and expand accessibility. We are actively working to ensure the server's optimal functionality, regularly updating and uploading all necessary tools and software for research staff. To further enhance our support infrastructure, we are in the process of expanding the system administration team. Our overarching goal is to extend access beyond ABI and IMB NAS RA, reaching educational and research institutes, as well as eventually clinical centers. This initiative aligns with our commitment to fostering widespread accessibility to cutting-edge bioinformatics resources, ultimately benefiting the broader scientific and medical communities.

03

EDUCATION

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## Courses

### Algorithms for Computational Biology and Advanced Algorithms for Computational Biology

Both of these two-month long courses, tailored for bioinformatics students and researchers, provided a comprehensive exploration of informatics skills, particularly in the realm of computational biology with an emphasis on sequence alignment methods. Topics encompassed fundamental algorithms, data structures, and concepts. Led by Dr. Pesho Ivanov, a seasoned professional with expertise in combinatorial algorithms for biological problem-solving, the course included weekly coding challenges and bonus

research tasks for interested participants. Pesho, who holds a background in applied mathematics and informatics, drew on his experiences as a teacher and programmer, showcasing projects in single-cell RNA-seq, T-cell receptors, phylogenetic tree intersection, and sequence assembly scaffolding. Pesho holds a PhD from ETH Zurich and is currently a postdoctoral researcher at the Pennsylvania State University in the United States.

#### Led by



*Pesho Ivanov, PhD*  
Pennsylvania State University, USA

#### Dates

28.02.2023–28.04.2023

## Led by



*Aleksei Kurnosov, PhD*  
Russian-Armenian University, Armenia



*Lilit Nersisyan, PhD*  
Armenian Bioinformatics Institute, Armenia

## Dates

13.01.2022-31.07.2023

## Led by



*Lilit Grigoryan, PhD*  
Stanford University, USA

## Dates

20.07.2023-10.08.2023

## Advanced Molecular Biology

This year-long course covered the core concepts of molecular and cellular biology, genomes and genetic mechanisms, and much more. Topics included DNA replication, membrane structure, cell communication, cancer, reproduction, development, tissues, and the immune system. Dr. Aleksei Kurnosov initially led the course and it was continued with Dr. Lilit Nersisyan. Dr. Kurnosov is a Molecular Biologist with a PhD from

the Institute of Bioorganic Chemistry in Moscow, and has a keen interest in education. Dr. Kurnosov has also taught at the Russian-Armenian University in Yerevan.

## Basics of Immunology

This two week mini-course covered the rapidly advancing field of the immune system in humans and across other species. Students discovered how every cell in a multicellular organism, from the tiniest microorganism to the largest vertebrates, fends off harmful invaders like bacteria, viruses, fungi, and larger parasites. There was a focus on the two layers of defense mechanisms in vertebrates

such as humans – the rapid, general “innate” responses, and the precise, specialized “adaptive” responses. The course was led by Lilit Grigoryan, who holds a PhD in Immunology from Stanford University in the United States. Dr. Grigoryan had also previously served as a guest lecturer in immunology at ABI’s OMICSS-21 and -22 summer schools.

# Capstones

In 2023, several ABI researchers graduated from their university programs defending theses covering the projects they have been working on at ABI.



## Emma Hovhannisyan

Bachelor's degree

*"Genetic Variability and Disease Resistance Analysis of Grapevine from Armenia"*

American University of Armenia (AUA)

Supervisor:  
Hans Binder, PhD  
Co-Supervisor:  
Maria Nikoghosyan

## Nelli Vardazaryan

Master's degree

*"The Effects of Geographical and Nutrient Variation on Bee Microbiome Composition: a Meta-Analysis"*

Institute of Molecular Biology (IMB),  
National Academy of Sciences (NAS)  
of Armenia

Supervisor:  
Lilit Nersisyan, PhD

## Yeva Bareghamyan

Master's degree

*"Mapping Gene Markers of Therapy Response in Liver Metastases of Colorectal Cancer"*

Yerevan State University (YSU)

Supervisor:  
Arsen Arakelyan, PhD

## Anush Baloyan

Bachelor's degree

*"Validating Population Structure Analysis Using Self Organizing Maps, a Case Study of Armenian Grapevines"*

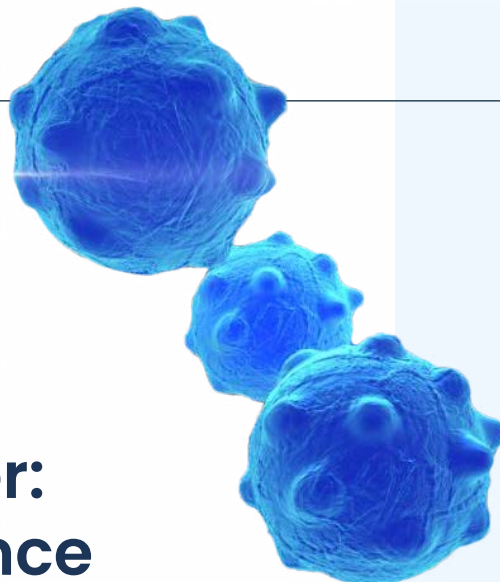
American University of Armenia (AUA)

Supervisor:  
Hans Binder, PhD

04

# RESEARCH

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# Metastatic Cancer: Resisting Resistance

Liver metastases significantly exacerbate the prognosis for various cancer diseases, including colorectal cancer. Our exploration of the molecular mechanisms underlying this phenomenon utilized bioinformatics and gene expression data from hundreds of tumor samples. Through our analysis, we uncovered that metastasis and prior treatments can give rise to fibrotic, non-immunogenic tumor states that elude

standard therapies, including immunotherapies, by acquiring epigenetic plasticity in cancer cells.

Our studies advocate for potential strategies to overcome treatment resistance through refined precision medicine options. This project will continue through collaboration with and support from Agenus, aiming to pave the way for innovative solutions in the battle against cancer.

**Principal Investigator**  
Hans Binder, PhD

**Funding**  
**agenus**

**In collaboration with**



UNIVERSITÄT  
LEIPZIG

Ashekyan O, Shahbazyan N, Bareghamyian Y, Kudryavzeva A, Mandel D, Schmidt M, Loeffler-Wirth H, Uduman M, Chand D, Underwood D, Armen G, Arakelyan A, Nersisyan L, Binder H. **Transcriptomic Maps of Colorectal Liver Metastasis: Machine Learning of Gene Activation Patterns and Epigenetic Trajectories in Support of Precision Medicine.** *Cancers.* 2023;15:15:3835. [doi:10.3390/cancers15153835](https://doi.org/10.3390/cancers15153835)



# VINE Bioinformatics: Advancing Grape Genomics for Innovative Viticulture

**Principal Investigator**  
Hans Binder, PhD

## Funding

**FAST** DISCOVERING  
THE FUTURE

**In collaboration with**



INSTITUTE OF MOLECULAR BIOLOGY

The grapevine stands as one of the earliest domesticated fruit crops, revered for both its fruit and its contribution to winemaking. Armenia, recognized as one of the ancient origins of grapevine domestication and wine production, holds a rich heritage in this regard. Our research endeavors focus on unraveling the diversity of Armenian vine accessions through a comprehensive analysis of their whole genomes.

To achieve this, we employed DNA sequencing and harnessed the power of machine learning knowledge mining. Through these methods, we gained insights

into the domestication history of grapevines and their correlations with phenotypic traits, including cultivar utilization and a potential resistance against powdery mildew.

The implications of our findings extend to addressing challenges in viticulture, particularly those posed by climate change. This project, one of the nine Advanced Research Programs supported by FAST, is intricately woven into international collaborations with partners in Georgia, central Europe, and China. Through our collective efforts, we aim to contribute to viticulture practices and foster innovation in the face of changing climate.

Margaryan K, Nikoghosyan M, Baloyan A, Gasoyan H, Hovhannisyan E, Galstyan L, Konecny T, Arakelyan A, Binder H. **Machine learned -based visualization of the diversity of vine genomes worldwide and in Armenia using SOMmelier.** *BIO Web Conf.* 2023;68, 01009. [doi:10.1051/bioconf/20236801009](https://doi.org/10.1051/bioconf/20236801009)

Konecny T, Nikoghosyan M, Binder H. **Machine learning extracts marks of thiamine's role in cold acclimation in the transcriptome of *Vitis vinifera*.** *Front. Plant Sci.* 2023;14. [doi:10.3389/fpls.2023.1303542](https://doi.org/10.3389/fpls.2023.1303542)



# Single-Cells in Space and Time

Cells serve as the fundamental building blocks within tissues and organs, orchestrating life in both space and time, thereby impacting processes related to disease and aging. Genomic sequencing technologies have entered the era of spatial single-cell resolution.

A dedicated team of junior researchers at ABI analyzes single-cell transcriptomics data, in cooperation with wet lab scientists from Leipzig University. Our studies focus on elucidating the mechanisms

underlying wound healing in the skin, unraveling the spatial microarchitecture of skin tumors (melanoma), and uncovering molecular communication links within the mouse brain.

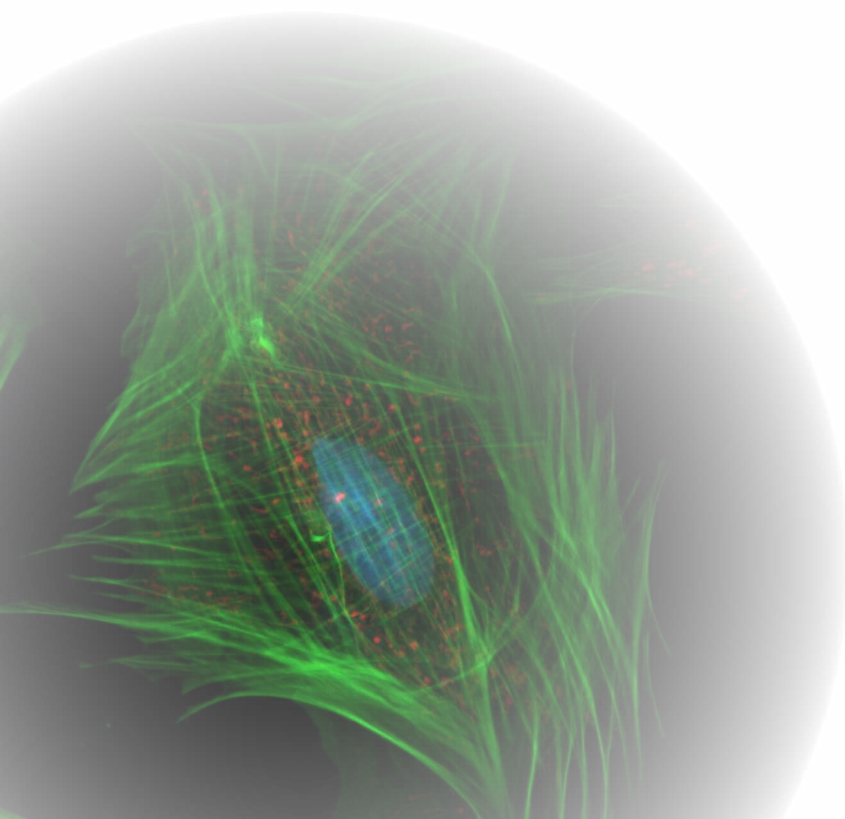
We have discovered that fibroblasts undergo identity changes during skin development and exert a profound influence on the invasiveness of cancer cells. Through this interdisciplinary collaboration, we aim to advance our understanding of health, disease, and aging processes on a cellular level.

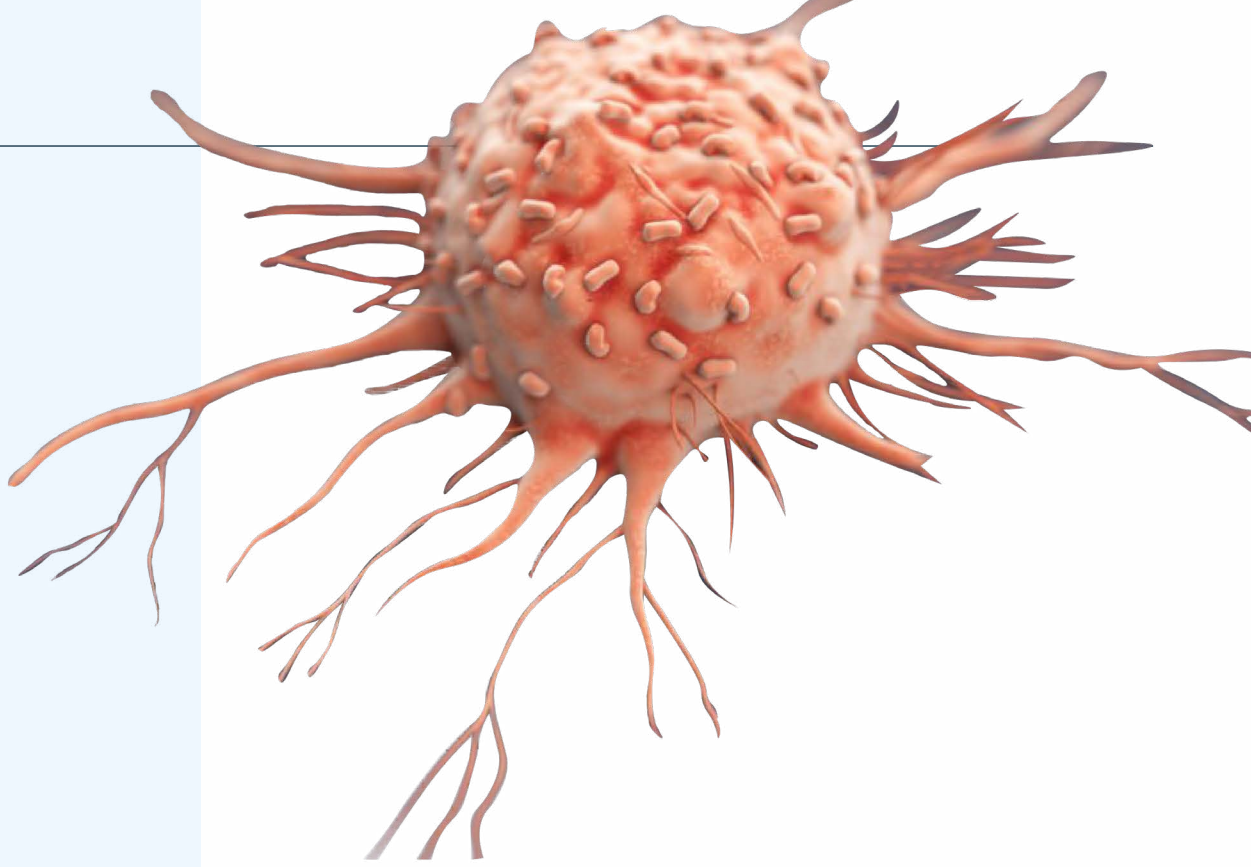
**Principal Investigator**  
Hans Binder, PhD

**In collaboration with**



UNIVERSITÄT  
LEIPZIG





## Fighting Cancer: Harnessing Flies for Precision Medicine

### Team leads

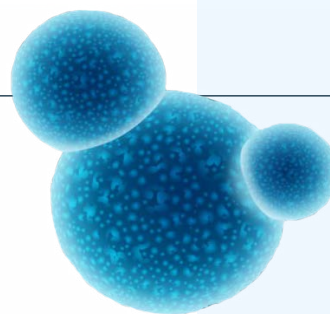
Hans Binder, PhD  
Nicolas Borisov, PhD

### Funding

**VIVAN**  
THERAPEUTICS

Vivan collaborates with ABI to bridge the gap in cancer drug research. Fruit flies, serving as experimental models, offer a unique avenue for testing drug combinations tailored for precision medicine. Since 2022, ABI has led a team of bioinformaticians and data scientists in direct involvement with Vivan's R&D. Our research centers on genetic biomarker discovery for precision cancer diagnostics and treatment decisions, integrating

machine learning and drug screening with genetic fly models. This collaboration aims to advance personalized cancer therapeutics, leveraging innovative approaches to enhance treatment options.



# Microbiome Dynamics: the Effects of Disease

Our bodies are inhabited by thousands of diverse species of microbes, such as bacteria and fungi, forming a complex ecosystem. Microbes cooperate or compete in different parts of the food chain, as they interact with their host. Our team is developing new computational tools to explore the chain of events that are involved in altering the composition of microbial communities, and to determine how such changes may lead to diseases in human patients.

In collaboration with Karolinska Institutet (Sweden) and the IMB NAS RA, ABI investigates the response of microbial communities to antibiotics, focusing on drug-resistant *Staphylococcus aureus* strains found locally in Armenia. Utilizing novel sequencing technologies and a broad range of

data analysis approaches, we investigate changes happening at the level of DNA and RNA upon antibiotic perturbations. Similar to humans, honeybees harbor thousands of gut bacteria, collectively known as the gut microbiome. The gut microbiome composition is an important factor regulating the health and social behavior of honeybees and may affect the recently observed decline in global honeybee populations. In collaboration with Yerevan State University and Utrecht University (The Netherlands), we are exploring honeybee gut microbiome variations across diverse geographies, spanning the USA, Europe, Armenia, and New Zealand, and study their response to herbicides and pesticides using the most current sequencing and data analysis approaches.

**Principal Investigator**  
Lilit Nersisyan, PhD

**In collaboration with**



INSTITUTE OF MOLECULAR BIOLOGY



**Karolinska  
Institutet**

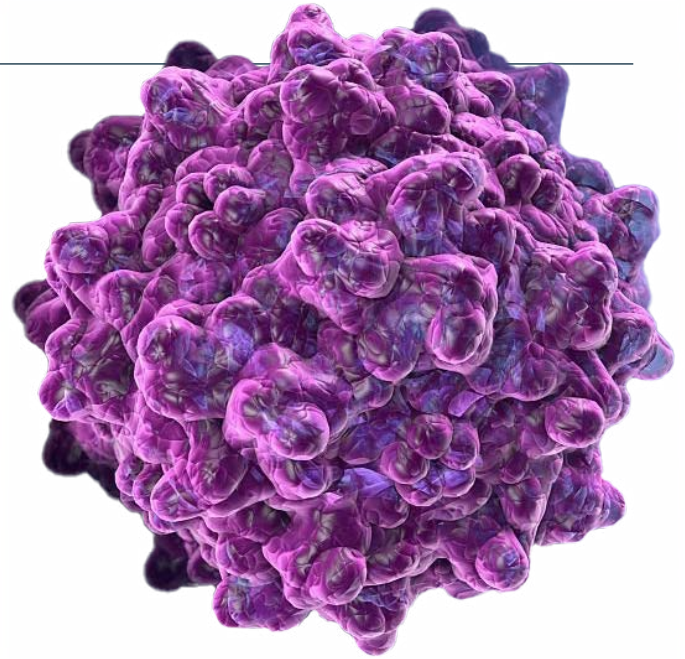


**Utrecht  
University**



**YEREVAN  
STATE  
UNIVERSITY**

Huch S, Nersisyan L, Ropat M, Barrett D, Wu M, Wang J, Valeriano VD, Vardazaryan N, Huerta-Cepas J, Wei W, Du J, Steinmetz LM, Engstrand L, Pelechano V. **Atlas of mRNA translation and decay for bacteria.** *Nat Microbiol.* 2023;8:1123–1136  
[doi:10.1038/s41564-023-01393-z](https://doi.org/10.1038/s41564-023-01393-z)



## Gene Therapies: Designing Vehicles for Disease Cure

**Principal Investigator**  
Lilit Nersisyan, PhD

**In collaboration with**



Some diseases are caused by the lack of a functional gene in the tissue preventing it from performing its functions. Gene therapies offer promise for treating such diseases. Gene therapies deliver the functional copy of a gene to the target tissue using viral capsules as delivery vectors. However, viral vectors are expensive to make and those add to the price of such therapies. Indeed, a recently released gene therapy to treat a rare genetic bleeding disorder called Haemophilia B, was coined as the most expensive drug on the market, costing \$3.5 million per dose. There is a need to optimize the production of these

vectors, to increase efficiency of delivery and reduce costs.

The team at ABI collaborates with the Wyss Institute at Harvard University and a US-based company Rejuvenate Bio to aid their efforts in designing more efficient viral vectors targeting age-related diseases. They utilize directed mutagenesis to prepare a diverse set of chimeric adeno-associated viral (AAV) vectors and select those that appear to be more efficient in the delivery of the gene to the target tissue. We developed a software tool to aid in the analysis and selection of the most efficient chimeric vectors.

# Cell Fate Prediction: Single-Cell Developmental Trajectories

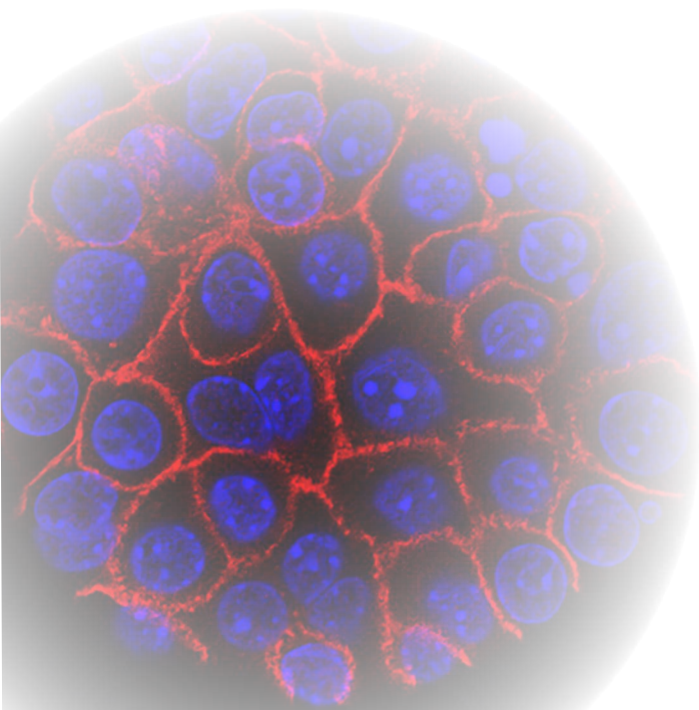
The cells in our bodies undergo functional and structural changes. During normal development, these changes give rise to the diversity of cell states forming the tissues and organs in our body. During disease, such changes may give rise to dysfunctional or malignant cells. Single-cell transcriptomics helps understand similarities between different cell types and build possible trajectories leading from one cell state to the other.

These trajectories are governed by changes in gene expression patterns

or RNA velocities of the genes. The single-cell RNA sequencing datasets not only contain information about the present state of gene expression patterns in the cells but also about the past and future states. With the support of a Science Committee development grant co-financed by Flagship Pioneering, our team utilizes the recent development of single-cell RNA sequencing technologies to use the hidden information about the past and future states of the cells and construct trajectories of cell state transitions that lead to healthy development or disease progression.

**Principal Investigator**  
Lilit Nersisyan, PhD

## Funding





## Non-Invasive Blood Tests Detecting Cancer

**Principal Investigator**  
Lilit Nersisyan, PhD

**In collaboration with**



University of Nevada, Reno

Blood is circulated by red blood cells that deliver oxygen to our tissues, the immune cells that fight infections, and the plasma that transports big and small molecules. Within the plasma, there is a small amount of circulating cell-free DNA, which originates from different tissues in our bodies. These DNA fragments have recently gained attention as possible biomarkers for non-invasive tests that could help us detect cancer and other diseases at earlier stages and/or frequently monitor the progress of cancer without the need for invasive biopsies. Such biomarkers are also referred to as liquid biopsies.

Our team concentrates on telomeres, specific chromosomal sites that are usually found at the tips of our chromosomes. Telomere length and sequence variation are known to contribute to the development of age-related diseases and cancers. Small amounts of telomeric sequences can also be found within circulating cell-free DNA pieces. Leveraging publicly available sequencing datasets and the tools we developed, we compare telomeric sequences in healthy individuals and those suffering from cancer and other disorders to discover cancer-specific biomarkers.

# Publications

Ashekyan O, Shahbazyan N, Bareghamyan Y, Kudryavzeva A, Mandel D, Schmidt M, Loeffler-Wirth H, Uduman M, Chand D, Underwood D, Armen G, Arakelyan A, Nersisyan L, Binder H. **Transcriptomic Maps of Colorectal Liver Metastasis: Machine Learning of Gene Activation Patterns and Epigenetic Trajectories in Support of Precision Medicine.** *Cancers*. 2023;15:15:3835. [doi:10.3390/cancers15153835](https://doi.org/10.3390/cancers15153835)

Avagyan S, Binder H. **Subtyping or not subtyping—Quo vadis for precision medicine of colorectal cancer.** *Transl Cancer Res*. 2023;12:5:1067–1072. [doi: 10.21037/tcr-23-133](https://doi.org/10.21037/tcr-23-133)

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Huch S, Nersisyan L, Ropat M, Barrett D, Wu M, Wang J, Valeriano VD, Vardazaryan N, Huerta-Cepas J, Wei W, Du J, Steinmetz LM, Engstrand L, Pelechano V. **Atlas of mRNA translation and decay for bacteria.** *Nat Microbiol*. 2023;8:1123–1136. [doi:10.1038/s41564-023-01393-z](https://doi.org/10.1038/s41564-023-01393-z)

Konecny T, Nikoghosyan M, Binder H. **Machine learning extracts marks of thiamine's role in cold acclimation in the transcriptome of *Vitis vinifera*.** *Front. Plant Sci*. 2023;14. [doi:10.3389/fpls.2023.1303542](https://doi.org/10.3389/fpls.2023.1303542)

Margaryan K, Nikoghosyan M, Baloyan A, Gasoyan H, Hovhannisyanyan E, Galstyan L, Konecny T, Arakelyan A, Binder H. **Machine learned -based visualization of the diversity of vine genomes worldwide and in Armenia using SOMmelier.** *BIO Web Conf*. 2023;68, 01009. [doi:10.1051/bioconf/20236801009](https://doi.org/10.1051/bioconf/20236801009)

Shkurnikov M, Nersisyan S, Averinskaya D, Chekova M, Polyakov F, Titov A, Doroshenko D, Vechorko V, Tonevitsky A. **HLA-A\*01:01 allele e diminishing in COVID-19 patients population associated with non-structural epitope abundance in CD8+ T-cell repertoire.** *PeerJ*. 2023;11:e14707. [doi:10.7717/PEERJ.14707](https://doi.org/10.7717/PEERJ.14707)

Zhiyanov A, Engibaryan N, Nersisyan S, Shkurnikov, M, Tonevitsky A. **Differential co-expression network analysis with DCoNA reveals isomiR targeting aberrations in prostate cancer.** *Bioinform*. 2023;39:2:btad051. [doi:10.1093/bioinformatics/btad051w](https://doi.org/10.1093/bioinformatics/btad051w)

# 05

## CONFERENCES & EVENTS

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### **Viticulture 2.0: A Conference in Armenia**

Renowned institutions and viticulture experts from Armenia, Sweden, France, and Germany convened for the “Viticulture 2.0: From Science to Vineyards” workshop, hosted by ABI and the IMB NAS RA on May 3 and 4. Supported by Alliance of National and International Science Organizations (ANSO) (Armenia-China-France) and ProGriCC (Production of Grapes in a Changing Climate) projects, the event featured insightful presentations and a captivating journey to the heart of Armenian viticulture in Vayots Dzor.



### **Grapevine Genomics Summer School in Italy**

From June 25 to 28, Anush Baloyan and Tomas Konecny, sponsored by GRAPEDIA (Grapevine Genomics Encyclopedia), a platform aimed at establishing open access for the grapevine research community, attended the [summer school](#) at the Edmund Mach Foundation in Trento, Italy. The program provided insights into Grapedia’s technology architecture, prototype progress, and upcoming challenges in grapevine data analysis. This training, targeting the scientific community, aimed to shape Grapedia’s future through lectures and hackathon sessions.



### **Machine Learning Summer School in the UK**

Hripsime Gasoyan attended the Oxford Machine Learning [Summer School](#) (OxML) from July 8 to 16, with funding from FAST (Foundation of Armenian Science and Technology). The program comprised MLx Fundamentals, covering topics such as linear algebra, optimization, and statistical machine learning, and MLx Cases, focusing on real-world ML issues, including data collection, transfer learning, and model interpretation.



### **Grapevine Genomics Workshop in Armenia**

A collaborative mini-workshop at FAST (Foundation of Armenian Science and Technology), took place on September 5, organized by the ABI Vine group, connected experts from Armenia and Georgia through the Swedish Institute funded project (ProGriCC grant), as well as potential stakeholders from the vine industry, Armenian Vine and Wine Association and Armenian National Agrarian University (ANAU).

Discussions centered on vine bioinformatics, the ADVANCE project, genetic diversity in Armenian grapes, Georgia's soils, vine genomes, functional genomics, and most importantly, future cooperation in all directions.



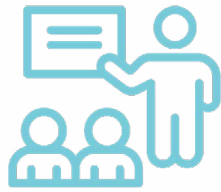
### **GRAPEDIA Annual Meeting in Spain**

The GRAPEDIA (Grapevine Genomics Encyclopedia) Annual Meeting in Valencia, Spain, held from September 11 to 13, gathered computational biology experts for grapevine research. Participants shared insights on databases and FAIR genomic data-sharing principles. Notably, Maria Nikoghosyan delivered an oral presentation titled "SOMmelier: analyzing genomic data and annotating grapes, particularly Armenian associations."



### **Wine Industry and Global Climate Change Challenges: A Workshop in Georgia**

ABI actively participated in the five-day workshop titled "Wine Industry and Global Climate Change Challenges" held in Telavi, Georgia, from October 2 to 6. Dr. Hans Binder, Armine Asatryan, Emma Hovhannisyan, and Tomas Konecny, representing ABI, shared valuable insights into the ongoing advancements in vine genomics and bioinformatics.



### **Managing a Bioinformatics Core Facility: An EMBL–EBI Course in the UK**

Lilit Nersisyan participated in the EMBL–EBI course on “Managing a Bioinformatics Core Facility,” gaining valuable insights into optimal practices for overseeing local and national bioinformatics infrastructures from November 7 to 9 in Hinxton, UK.



### **Exploring Vine–Related Bioinformatics: ProGriCC Winter Workshop in Sweden**

The ProGriCC winter workshop in Uppsala, Sweden took place from December 11 to 14. This workshop served as a gathering for ProGriCC partners and researchers from GRAPEDIA. The primary objective was to discuss the vine-related bioinformatics program and explore its continuation in the upcoming years. Both Dr. Hans Binder and Tomas Konecny presented at the Public Symposium on “Research in the Field of Winemaking under Climate Change.”

06

PEOPLE

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## Director

**Lilit Nersisyan, PhD**

## Board of Trustees

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 National Academy of  
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**Eduard Avetisyan**  
 European Molecular  
 Biology Laboratory (EMBL),  
 Germany

**Rafi Baghdjian**  
 Center for Scientific  
 Innovation and Education  
 Foundation, Armenia

## Research Team

\*Some of the researchers have contributed part time, remotely, and/or in-kind

**Hans Binder**, PhD, PI

**Siras Hakobyan**,  
PhD (c)

**Nelli Vardazaryan**,  
PhD (c)

**Lilit Galstyan**, MSc (c)

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**Meline Mkrtychyan**,  
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**Kristine Margaryan**, PhD

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**Ohanes Ashekyan**,  
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**Maria Nikoghosyan**,  
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**Luiza Stepanyan**, BSc (c)

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**Nikolay Borisov**, PhD

**Tomas Konecny**,  
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**Daniil Igumnov**,  
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**Daria Laricheva**,  
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## Operations Team

**Karine Shahgaldyan**  
HR Administrative Assistant

**Sona Melikjanyan**  
Graphic Designer

**Volodya Poghosyan**  
Full-Stack Developer

**Araz Chiloyan**  
Operations and  
Development Manager

**Antranik Wartanian**  
Systems Administrator

**Mariam Hovsepyan**  
Legal Expert

**Khachatur Ashotyan**  
Systems Administrator

## Mentors and Volunteers

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University of Nevada

**Erik Aznauryan, PhD**  
Harvard University

**Marta Tortegrossa, PhD**  
Leipzig University

**Susanna Avagyan, MSc (c)**  
Stanford University

**Sevag Makdissian**  
Birthright Armenia, operations

**Stepan Nersisyan, PhD**  
Thomas Jefferson University

**Arsen Arakelyan, PhD**  
IMB NAS RA

**Juliane Liou, PhD**  
Leipzig University

**Phillip Guevorgian**  
YerevaNN

**Tigran Petrosyan**  
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**Valeri Vardanyan, PhD**  
University of Tokyo

**Maria Schmidt, PhD**  
Leipzig University

**Chrats Melkonian, PhD**  
Utrecht University

**Ketrin Boyacioglu**  
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Serbia

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Moscow State Medical  
University named after I.M.  
Sechenov, Russia

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Bioinformatics Scientist  
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**Susanna Avagyan**  
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**Daria Laricheva**  
MSc (c) at Brandeis  
University, USA

**Levon Galstyan**  
MS (c) at Johns  
Hopkins University, USA

**Ohanes Ashekyan**  
PhD (c) at University of  
Ottawa, Canada

07

**CELEBRATING  
INDIVIDUAL  
ACHIEVEMENTS**

---





**Susanna  
Avagyan**

Editorial publication in  
*Translational Cancer  
Research*;  
MSc Candidate at  
Stanford University



**Tatevik  
Jalatyan**

Chevening Scholarship  
for Oxford University;  
ABI Curiosity Award



**Tomas  
Konecny**

Publication in  
*Frontiers in Plant  
Science*



**Siras  
Hakobyan**

Publication in  
*Frontiers in  
Genetics*



**Maria  
Nikoghosyan**

Oral presentation  
at GRAPEDIA  
Annual Meeting



**Emma  
Hovhannisyan**

ABI Curiosity  
Award



**Nelli  
Vardazaryan**

Young Scientist  
Support Program  
Grant Recipient



**Levon  
Galstyan**

MSc Candidate  
at Johns Hopkins  
University



**Arpine  
Grigoryan**

Erasmus+ Program  
at Lille University



**Sean  
Mintz**

MIT Internship,  
MIT's MISTI  
program



**Nerses  
Shahbazyan**

Publication  
in *Cancer*



**Ohanes  
Ashekyan**

Publication  
in *Cancer*

08

# FUNDING

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# Budget

In 2023, both our sources of income and expenses experienced a remarkable surge, more than tripling compared to the previous year. In our inaugural year, we relied exclusively on donations to drive the development of our human resources and lay the groundwork for diversifying our funding streams. However, over the past two years, our financial landscape has evolved significantly, with industry collaborations and research grants emerging as substantial contributors

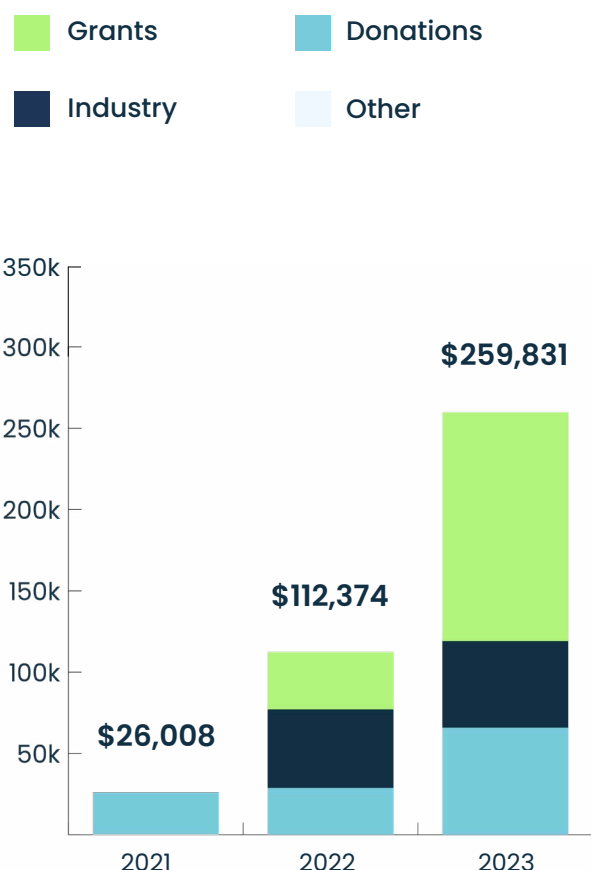
to our organization's income.

Notably, alongside donations, these collaborations and grants have played a pivotal role in fortifying our financial foundation. Equally crucial are the in-kind contributions made by numerous researchers who have generously dedicated their time to our projects. It's important to note that these invaluable contributions, though not explicitly reflected in our expense charts, have significantly

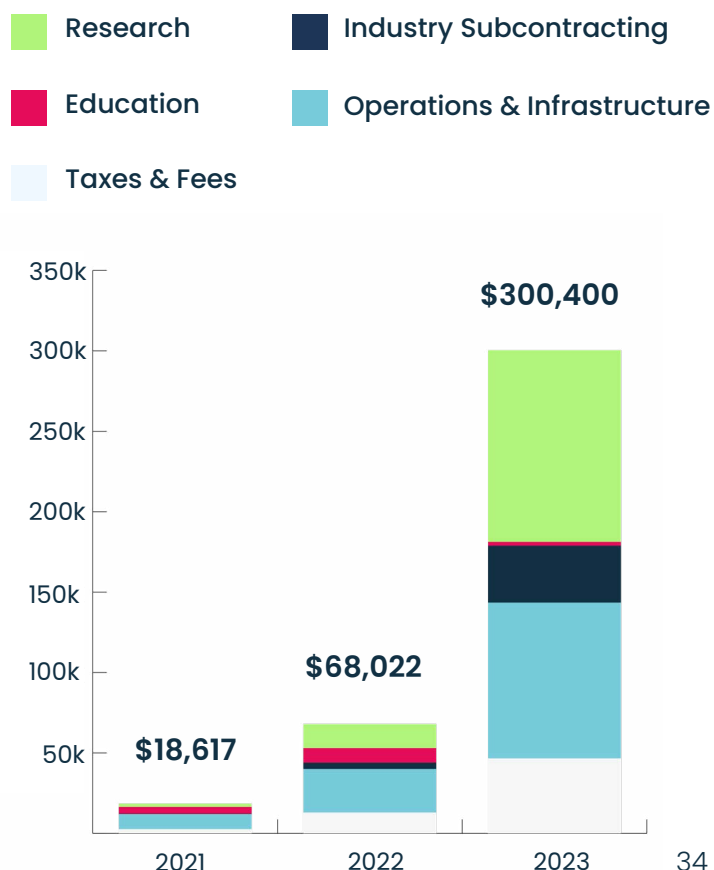
enriched the scope and impact of our initiatives.

Fueled by these combined efforts, we have successfully secured the necessary funds to embark on the continuous expansion of our team in 2024, ensuring the continuity and growth of our ongoing activities. Looking ahead, our commitment to furthering our mission remains steadfast, and we plan to sustain this momentum through continued fundraising activities, industry collaborations, and research grants.

## Income (USD)



## Expenses (USD)



## Donors

As we strive for further growth and the realization of additional projects, we extend our gratitude to all those who have been instrumental in our journey so far. With the unwavering support of our private donors and organizations, we are poised for continued success in the pursuit of our organization's goals.

## Donation Matching Organizations

Adobe Armenia Inc.  
AMD Inc.

Synopsys Inc.  
Netflix

VMware  
Spotify

## Donation Platforms

Benevity

Global Giving

ReArmenia

ARPA Institute

## Industry Collaborations

agenus

VIVAN  
THERAPEUTICS

## Research & Infrastructure Support Grants



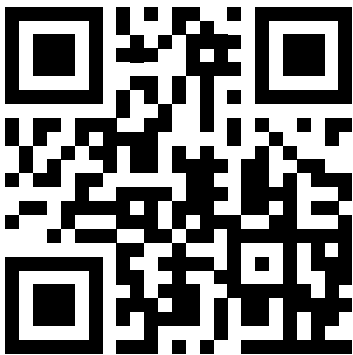
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