



*Aerial view of the Center*

---

# INSIDE THIS ISSUE

---

## PG. 2

News

---

## PG. 3

Publications

---

## PG. 4

Events

Dear readers,

As we bid farewell to 2023, it is with great pleasure that we present to you the second edition of our newsletter, encapsulating the highlights and achievements of the past year.

Notable endeavors of our Center this year were the addition of the Biomolecular Engineering and Synthetic Biology research direction, the collaboration with the National Network of Molecular Oncology and the setup of a new facility for single-cell Next Generation Sequencing analysis.

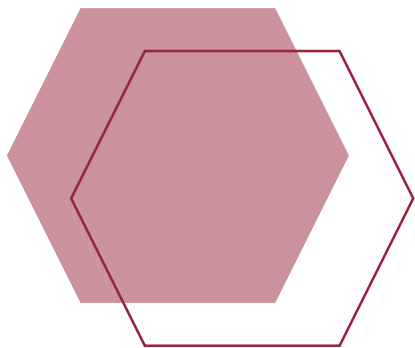
In the realm of research publications, we are proud to share the impact of our work this year with a selection of papers on chronic inflammation, neurodegeneration, cancer, bioinformatics, global metagenomics and biodiversity among others. The collective knowledge generated by our dedicated teams continues to contribute to the global scientific community, shaping the future of healthcare.

Throughout the year, in our ongoing efforts towards science dissemination, we organized school visits, actively participated in numerous science festivals and conferences and also setup a new social media platform. Through these actions we engaged with audiences ranging from kindergarten children to final year students, as well as with the scientific community and the general public.

Last but not least, a special highlight of this year for us was the Athens Authentic Marathon. We were particularly thrilled to join this event as a group for the first time, a truly unique experience that united us in the spirit of collaboration and perseverance.

As the year draws to a close, we express our warmest wishes for a joyful holiday season and a New Year filled with inspiration, creativity, exciting discoveries and continued scientific excellence.

*Happy New Year!*  
*The OpenFleming team*



## NEW RESEARCH DIRECTION & NEW IBI DIRECTOR



FLEMING has enriched its research directions with the addition of the Skretas Lab. Dr Georgios Skretas is the new Director of the BSRC FLEMING Institute for Bioinnovaton (IBI) since July 2022.

The Laboratory of Biomolecular Engineering & Synthetic Biology is a multi-disciplinary group whose activities lie at the interfaces of biology, chemistry and engineering. Its main goal is the development of engineered microbial cells with the ability to perform novel and complex functions by employing principles of Synthetic Biology.

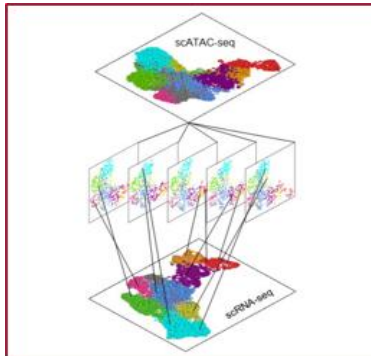
# NEWS

## EDIMO NETWORK



Inaugural meeting of the National Network of Molecular Oncology (EDIMO) on 6 November 2023 which includes the Genomics Facility of FLEMING. The network offers oncology services and coordinates cutting-edge research in molecular oncology, precision medicine and clinical bioinformatics, for the development of effective and personalized cancer therapies.

## SINGLE CELL ANALYSIS UNIT



New core facility initiative developed in the Kollias Lab and operational since October 2023, with the mission to provide analysis services and technical support to researchers that wish to conduct single cell Next Generation Sequencing (scNGS) studies.

## BUILDING RENOVATION

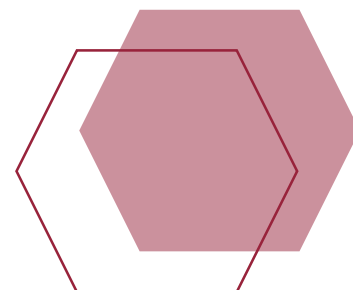


The EU National Recovery & Resilience Fund Greece 2.0 initial budget approval, for the first phase of the FLEMING building renovation has taken place in 2023. Renovation works are expected to begin in 2024.

## INSTAGRAM PLATFORM



New social media platform launched in August 2023 for science communication and the dissemination of BSRC FLEMING activities to the general public.



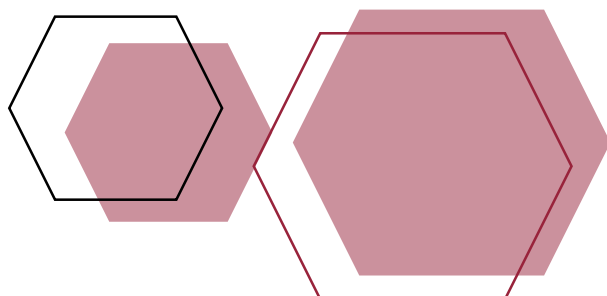


In 2023, FLEMING has made significant strides in advancing scientific knowledge.

The following summary captures a selection of impactful contributions to diverse fields, made by FLEMING researchers this year.

For more information see [here](#)

Pavlopoulos et al. *Unraveling the functional dark matter through global metagenomics.* *Nature* 622, 594-602 (2023)



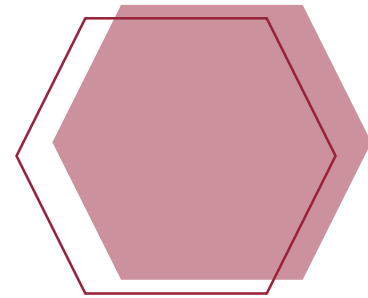
# PUBLICATIONS

This year we:

- Explored how cells respond to DNA damage caused by genotoxic agents, and how this relates to the genetic changes seen in melanoma tumors caused by UV exposure.
- Revealed a new role for histone H2Bub, an epigenetic modification, in influencing the speed at which our genes are read, especially when our cells are under stress that can damage DNA.
- Were the first to demonstrate how changes in alternative splicing can render mitochondria dysfunctional.
- Repurposed the antipsychotic drug amisulpride for the treatment of mouse rheumatoid arthritis, through targeting the activation of one of the main cellular drivers of the disease, the joint synovial fibroblasts.
- Advocated for sustainable beekeeping practices, highlighting citizen-driven solutions to enhance honeybee survival rates and address biodiversity challenges.
- Explored the Earth's microbiome, doubling known protein families, and opening new frontiers for scientific exploration.
- Introduced the NMPFamsDB database, significantly expanding known protein sequence clusters and providing insights into microbial life.
- Developed Arena3Dweb, an interactive tool for visualizing multi-layered biological networks in 3D space.
- Presented SCALA, a user-friendly software application for analyzing and visualizing single-cell RNA-seq and single-cell ATAC-seq data.
- Provided surprising evidence for the role of Tau aggregates, thought to drive neurodegeneration and cognitive decline, as protective rather than detrimental, preserving and promoting protein synthesis-dependent memories.
- Explained how gene regulation may contribute to risk for complex disease, through the study of adipose tissue in Greek individuals.
- Linked rare genetic variants to the MRKH syndrome, a condition resulting in female infertility.
- Challenged conventional views by proposing the 'peripheral adaptive immune mesenchyme' framework, highlighting cancer-associated fibroblasts as positive regulators, redefining the cancer-immunity cycle, and presenting a roadmap for therapeutic leverage.
- Employed the Sp3 sample preparation and DIA-NN data analysis strategy for quantitative proteomics, revealing protein alterations, interactions, and potential drug targets across various species.
- Collaboratively established recommendations for the harmonization of education, training and continuing professional development of laboratory animal caretakers, technicians and technologists.



FLEMING researchers co-organized 3 international conferences in 2023. The Adhere 1 conference in Croatia was the first in a series of annual conferences focused on cell adhesion and co-organized by Dr Vassiliki Kostourou. The Bio3 forum in Athens on human health in the AI era was co-chaired by the Head of Bioinformatics Dr Georgios Pavlopoulos, while Prof Eleni Douni served as chairman of the organizing committee for the 73<sup>rd</sup> HSBMB conference in Athens.



# EVENTS

## MAY PINT OF SCIENCE



FLEMING researchers joined this year's Pint of Science festival, an international event that brings researchers together with the general public and allows them to share their scientific findings through entertaining talks and relaxed conversations with the audience.

## JUNE PRESCHOOL STEM EDUCATION



FLEMING scientists visited the kindergarten school Emedof for a STEM education day, to talk to children about biology, to do simple DNA extraction experiments with them and to inspire the next generation of researchers!

## SEPTEMBER RESEARCHER'S NIGHT



FLEMING joined this year's Researcher's Night and presented its research on the use of bioinformatics for mapping the planetary microbiome and studying the effects of climate crisis on biodiversity.

## OCTOBER ATHENS SCIENCE FESTIVAL



FLEMING researchers joined this year's special "Shape your Future" ASF event, which highlighted STEM professions and offered career guidance to students.

## NOVEMBER ATHENS MARATHON

With an overwhelming participation of more than 70 runners and the generous support of our sponsors, St. Lawrence College and the HFRI, FLEMING joined the 40<sup>th</sup> Athens Marathon for the first time as a team, marking a very special milestone.

