

UNAT

Ultra-small Nanohybrides for Advanced Theranostics

Newsletter 7 – October 2025

Consortium



Lyon 1

Coordinator

Université Claude
Bernard Lyon 1
France



Science Park
Taras Shevchenko University of Kyiv

Corporation
Science Park
Taras
Shevchenko
University Of Kyiv
Ukraine



National Research Council of Italy

Consiglio
Nazionale Delle
Ricerche
Italy

BIOEMTECH

Bioemission
Technology
Solutions IKE
Greece



Glincs
France

The project

Nanoscale materials have gained a place in the spotlight as enablers of combination diagnostic-therapeutic technologies due to their tiny penetrating sizes and their unique functional properties.

Nanohybrids that contain both organic and inorganic components, including metallic ones, offer tremendous opportunity for the functionalisation of biological or bioactive molecules.

The EU-funded UNAT project will explore the capabilities of metal-carbon nanohybrids for multimodal in vivo imaging and therapy of tumours via electromagnetic radiation.

The diagnosis and therapy of cancer will be evaluated through an ambitious campaign of preclinical in vitro and in vivo experiments.

Key figures

5 years (2021-2026)

5 partners

4 countries

832 k€

More information on www.unat-project.eu

UNAT Implemented secondments

Research and Innovation Staff Exchange (RISE) projects fund short-term exchanges (“secondments”) for staff to develop careers combining scientific excellence with exposure to other countries and sectors. RISE enables more interaction between academia and non-academic organisations within Europe and worldwide.

The following secondments were implemented between **February 2025** and **October 2025**:

SARPAKI Sophia	BIOEMTECH	UCBL	25/06/2024	25/07/2024
ZADERKO Alexander	UCBL	BIOEMTECH	02/11/2024	03/12/2024
GELOEN Alain	UCBL	BIOEMTECH	06/11/2024	06/12/2024
KUZNIETSOVA Halyna	SCIENCE PARK	UCBL	13/05/2025	27/06/2025
DZIUBENKO Nataliia	SCIENCE PARK	UCBL	13/05/2025	27/06/2025
DOVBYNCHUK Taisa	SCIENCE PARK	UCBL	13/05/2025	27/06/2025
TOPCHYLO Anna	SCIENCE PARK	UCBL	05/05/2025	04/07/2025
LYSENKO Anastasia	SCIENCE PARK	UCBL	05/05/2025	04/07/2025
HRABCHUK Halyna	SCIENCE PARK	UCBL	28/05/2025	01/07/2025
BAKHINA Anna	SCIENCE PARK	UCBL	28/05/2025	01/07/2025
PYLYPOVA Olha	SCIENCE PARK	UCBL	01/06/2025	30/06/2025
IVANOV Ivan	SCIENCE PARK	UCBL	23/06/2025	26/07/2025

Participation of UNAT members in the conference “Seeing the Invisible”

Several UNAT members took part in the international conference “*Seeing the Invisible: from Imaging Agents Design to Biological and Clinical Applications*” held from May 26 to 28, 2025 in Orleans, France.

On this occasion, **Vladimir Lysenko (UCBL)** delivered an oral presentation entitled “*Carbon Dots@DOTA-Gd Nanohybrids and their Multi-Modal Bio-Imaging Applications*”, while **Sergii Lytvynenko (Science Park)** presented a poster on “*Photoelectric Imaging of Biological Cells*”.

Find the abstracts [here](#) (p.32 ; p.52).



Annual conference "Nanohybrids-XXI", 2025



The annual conference Nanohybrids XXI-2025 took place from May 19-21, 2025 in Porquerolles – France.

A special session was dedicated to the UNAT project, with several speakers, on Monday evening, May 19, and Tuesday morning, May 20.

May 19

- i. Intervention of **ZADERKO Alexander (UCBL)** “*Synthesis of Fluorinated Carbon Dots@DOTA-Gd nanohybrids for theranostic application*”
- ii. Intervention of **LYSENKO Vladimir (UCBL)** “*Optical properties of biocompatible Fluorinated Carbon Dots@DOTA-Gd nanohybrids for sensing and bio-imaging*”

May 20:

- iii. Intervention of **SKRYSHEVSKY Valeriy** (Science Park) “*Applications of carbon-based nanostructures for energy conversion, sensing and theranostics*”
- iv. Intervention of **BORISOVA Tatiana** (Science Park) “*Heavy metal chelating ability of raw and functionalized “green” carbon-based nanoparticles/materials in biological system, brain nerve terminals*”
- v. Intervention of **KUZNIETSOVA Halyna & DZIUBENKO Nataliia** (Science Park) “*Multiplicity of mechanisms of carbon dots’ biological activity: key considerations*”



(iii)



(iv)



(v)

Publication of articles

Revue : Journal of Materials Chemistry B

Title: “**Gadolinium-doped carbon dots derived from peanut shell waste for bioimaging applications**”

Authors: Federica Mancini, Arianna Menichetti, Alessio Adamiano, Marco Montalti, Konstantin Paliienko, Alain Géloën, Vladimir Lysenko, Michele Iafisco

DOI: 10.1039/D5TB01420D - [Open access link on HAL](#)

Revue : ACS Applied Nano Materials

Title: “**Gd 3+ -Doped Biocompatible Fluorinated Carbon Dots for Bimodal Bioimaging Applications**”

Authors: Anna Topchylo, Konstantin Paliienko, Alexander Zaderko, Tetyana Nychporuk, Alain Géloën, Olha Pylypova, Ivan Ivanov, Valeriy Skryshevsky, Vladimir Lysenko

DOI: [10.1021/acsanm.5c03446](https://doi.org/10.1021/acsanm.5c03446) – [Open Access link on HAL](#)

Revue : Biomaterials Science

Title: “**Gd³⁺-doped carbon dots: modulation of mechanisms regulating gastrointestinal tract motility and the hepatobiliary system**”

Authors : Olga V Tsybalyuk, Tamara L Davydovska, Vladimir Lysenko, Ivan S Voiteshenko, Konstantin Paliienko, Tatiana A Borisova, Stanislav P Veselsky, Alex Y Nyporko, Olha V Pylypova, Tetiana O Fedirko, Anna M Naumenko, Evelina D Melenevska, Mariya S Kozolup, Valeriy A Skryshevsky

DOI : <https://doi.org/10.1039/D5BM01077B> - [Open access link on HAL](#)

Revue : BMC CANCER

Title : **“Impact of irradiation conditions on therapy of Lewis lung carcinoma in mice using glucose-ethylenediamine carbon dots”**

Auteurs : Pavlo Lishchuk, Halyna Kuznietsova, Taisa Dovbynychuk, Nataliia Dziubenko, Liudmyla Garmanchuk, Sergei Alekseev, Mykola Isaiev, Nataliya Pozdnyakova, Artem Pastukhov, Nataliya Krisanova, Tatiana Borisova, Vladimir Lysenko, Valeriy Skryshevsky

DOI : 10.1186/s12885-024-13404-1 – [Open access link on Springer Nature](#)

Revue : Environmental Science : Nano

Title : **““Green” carbon dots from coffee waste for adsorption of xenobiotic and trace heavy metals in both aquatic and physiological media”**

Authors : Natalia Krisanova, Konstantin Paliienko, Natalia Pozdnyakova, Artem Pastukhov, Mykola Driuk, Liliia Kalynovska, Marina Dudarenko, Arsenii Borysov, Valeriy Skryshevsky, Vladimir Lysenko and Tatiana Borisova

DOI : <https://doi.org/10.1039/D5EN00345H> - [Open access link on HAL](#)

Revue : Scientific Reports

Title : **“Carbon dot based dressing for therapy of chemically-induced cutaneous burns”**

Authors : Halyna Kuznietsova, Arsen Ishchuk, Iryna Byelinska, Tetiana Lysenko, Volodymyr Melnytsky, Olexandr Ogloblya, Alexander Zaderko, Anna Kalinina, Denys Kryvosheiev, Vladimir Lysenko & Nataliia Dziubenko

DOI : 10.1038/s41598-025-90893-5 – [Open access link on HAL](#)

Application for the Patent of Ukraine

UNAT members from **Science Park** team (**Nataliia Dziubenko, Halyna Kuznietsova, Konstantyn Paliienko, Valeriy Skryshevsky, Tatiana Borisova, Tatiana Lysenko**) filled the Application for the Patent of Ukraine **“Healing agent for use in chemical burns”** application number No. a202501733. Date of registration: 17.04.2025

Oral presentation – Science Park

Prof. **Valeriy Skryshevsky** (Science Park) delivered a keynote oral presentation entitled **“Synthesis and applications of carbon-based nanohybrids”** at IXth International Materials Science Conference, **HighMatTech-2025** organised in Kyiv, 7 October 2025

Conference presentations are available at the

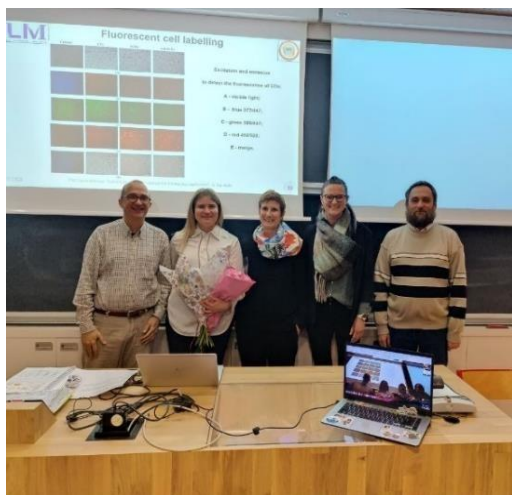
following link : <https://www.youtube.com/live/Ve->

[bbNEKymM?si=gugt8yY5XWMohjvd](https://www.youtube.com/live/Ve-bbNEKymM?si=gugt8yY5XWMohjvd)



Defense of thesis of Dr. TOPCHYLO Anna (Science Park)

The early-stage researcher, **Anna TOPCHYLO**, young member of the UNAT consortium, PhD candidate in cotutelle between UCBL and Taras Shevchenko National University of Kyiv, under the supervision of **Prof. Valeriy SKRYSHEVSKY** and **Vladimir LYSENKO**, successfully defended her thesis entitled “**Carbon-based nanomaterials for bioimaging application**” at UCBL on **February 19, 2025**.



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