



# GRAPHENEXPO & Conference 2022

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## UltraWire Workshop 2022

Conductive Materials Solutions Workshop

### Preliminary Agenda

### Speakers & Participating Organisations

**Date:** 29<sup>th</sup> & 30<sup>th</sup> June 2022

**In person meeting venue:** Conference Room  
Paula Browne House,  
Murray Edwards College  
Cambridge  
CB3 0DF

**Dinner venue (29<sup>th</sup> June):** Sidney Sussex College,  
Cambridge,  
UK

#### Organiser:



CAMBRIDGE  
NANOMATERIALS  
TECHNOLOGY LTD

# UltraWire Workshop & GRAPHENEXPO 2022

## Preliminary Agenda

### Date 1

**Date:** 29<sup>th</sup> June 2022

**Venue:** Conference Room,  
Paula Browne House, **Murray Edwards College**,  
Cambridge (in person venue) –  
**ZOOM** (online participation)

**Dinner Venue:** The Old Library  
Sidney Sussex College, Cambridge

**10:00** Arrival, registration and networking

**10:30** *Online session - opening & testing*

**10:45** **Dr Bojan Boskovic**, CEO, Cambridge Nanomaterials Technology Ltd

Welcome and Introduction to the UltraWire Workshop 2022 & GRAPHENEXPO 2022 Conference

**11:00** **Dr George Maistros**, ADVISE-DETA Ltd., UK

**Title: Sensors for quality control of nano-reinforced structures**

Interdigital sensors with impedance spectroscopy are used to evaluate the degree of dispersion of nanoparticles in polymers or in aqueous solutions. The sensors can be introduced to the solution at the time of dispersion of nanoparticles and the impedance measurement hardware performs scans over a wide frequency range. The sensors produce a fringing electric field over their surface and the response of the solution is recorded as impedance spectrum. The spectrum can be analysed with the help of equivalent electrical circuit models where the circuit elements can represent physical processes in the dispersion of nanoparticles. The time evolution of the values of the electrical circuit components is correlated to the changes in the size and interactions of the nanoparticles in the solution.

The same technique has been used in composite materials manufacturing to monitor in situ and in real time the progress of the cure reaction of the resin and provide a means of on-line quality control in production

**11:30** **Akram Zitoun**, Brunel University, UK

**Title: Graphene-based strain sensing in composites for structural and health monitoring applications**

Graphene is well known for its excellent physical properties. The presentation covers the use of graphene-based strain sensors systems for the assessment of the health of composite structures. The graphene sensor was applied on the composite structure through different scenarios. It was attached on CFRP and GFRP coupons either on the surface or embedded. The work focused on composite structure as they are more interest across different industrial sectors due to their mechanical properties.

**12:00** Dr Julio Gomez, Avanzare, Spain

**Title: Use of graphene materials in low resistivity inks and composites**

The use of different graphene materials (GRMs) allows to obtain low impedance inks and composites for their use in indifferent applications such as flexible electronics.

The ability and the possibility to produce graphene materials by using different production methods, give the ability to modulate the final properties of the inks and composites

**12:30** Discussion

**13:00** *Lunch break and networking*

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**14:30** Dr Amaia Zurutuza, Graphenea, Spain

**Title: Developing a Graphene Industry**

Graphene is a relatively new nanomaterial with outstanding properties that could potentially be applied in many different fields. However, in order to integrate a new material into well-established industries such as the semiconductor industry, there are many challenges that will need to be overcome. During this talk, I will explain industrially viable ways to produce graphene and cover some of its potential applications.

**15:00** Dr Vahid Javan Kouzegaran, Nanografi Nano Technology, Turkey

**Title: Graphene Oxide Frameworks (GOFs) as Advanced Materials for Applications in Energy Storage & DNA-based Molecular Junctions**

The expansion of 2D graphene oxide (GO) sheets by the cross-sectional solvothermal reaction of organic linkers as pillaring agents with the functional oxygen groups leads to a porous largely interlayered structures referred to as graphene oxide frameworks (GOFs) with the restored electrical conductivity and improved thermal stability. The solvent-free activated GOFs with highly increased surface area and porosity could be considered as promising candidates for applications in energy storage as electrode materials in various battery technologies and supercapacitors as well as molecular junctions. Theoretical and computational investigations demonstrate that electronic transport properties in GOFs are governed by quasidegenerate and tunneling regimes. The covalent reaction of organic linkers with active sites of GO establishes through-molecule conductivity that can be tuned depending upon the chemical composition and length of the linking molecules.

**15:30** coffee break

**16:00** discussion

**16:30** End of day one

**19:00** Dinner at the Old Library in Sidney Sussex College, Cambridge

## Date 2

**Date:** 30<sup>th</sup> June 2022

**Venue:** Conference Room,  
Paula Browne House, **Murray Edwards College**,  
Cambridge (in person venue) –  
**ZOOM** (online participation)

**10:00** Delegates arrival and registration

**10:15** *Online session - opening & testing*

**10:30** **Dr Bojan Boskovic**, CEO, Cambridge Nanomaterials Technology Ltd

Welcome and Introduction to the UltraWire Workshop 2022 & GRAPHENEXPO 2022 Conference

**11:00** **Prof. Anna Boczkowska**, TMBK Partners, Poland

**Title: Ultralight CNT-doped veils for the modification of composite' properties.**

Ultralight CNT-doped veils are based on thermoplastic polymers, carbon nanotubes and other fillers whose introduction into the composites' structure improves the electrical, mechanical and thermal properties. They can be used in the aviation, automotive, construction, machine, defence, and electronics industries for electromagnetic shielding and electrical discharge. Strengthening the laminates with nonwovens improves their electrical and mechanical properties, increasing their impact strength and limiting delamination, while minimising weight and manufacturing costs. The CNT-doped veils are intermediate products in composite material production, used as surface finishing or interleaves between fabrics or prepregs. They are easy in handling and safe during production of composites with common techniques such as RTM, infusion, Autoclave or Out of Autoclave. Pilot plant for manufacturing of CNT-doped veils was established in TMBK Partners Sp. z o.o. (Warsaw, Poland) in 2017

**11:30** **Prof. Park Joung-hu**, Songsil University, South Korea

**Title: CNTFs-based Wires for Mega-Hertz Wireless Power Transfer**

This presentation shows an example of CNTF wire application to investigate a planar spiral transformer suitable for WPT charging systems. Efficiency of the transformer is investigated theoretically and experimentally over several MHz frequencies and ampere currents. The CNTFs-based wireless transformer operation was compared with copper (Cu) based wireless transformer fabricated with similar dimensions and DC resistance values. The AC resistance of both transformers is calculated using the conventional model of solid round conductor and the FEM simulation. It is found that the calculated and the FEM AC resistance values are matched in case of Cu transformer with 4194A Impedance/Gain-Phase Analyzer measurements while they are mismatched in case of CNTFs one. Therefore, a correction factor for the AC resistance of CNTFs wire is proposed to match the calculated AC resistance with the measured one. Furthermore, both transformers were tested experimentally within 50 W/6.78 MHz WPT charging systems at different ampere currents.

**12:00** **Dr Ana Bankovic Cassidy**, Cambridge Nanomaterials Technology Ltd (CNT), UK

**Title: 3D Printing Graphene micro-fluidic medical devices**

An overview of current patenting and market trends in the field of microfluidics, 3D printing and nanocarbon medical devices will be given including key players and ongoing projects. The

importance of innovation management and modern exploitation tools will be introduced, as they are having an essential role in supporting the exploitation of cutting-age interdisciplinary technologies, such as 3D printed nanocarbon microfluidic medical devices. The introduction of nanocarbon materials such as graphene for 3D printed lab on chip (LoC) medical applications required stakeholders to understand and apply innovation management tools to secure translation from excellence of science, scaling-up of manufacturing processes and establishment of an industrial nanomedicine sector. An example of the European H2020 project M3DLoC ([www.m3dloc.eu](http://www.m3dloc.eu)) would be given.

**12:30** Lunch break & networking

Visit our virtual expo; [www.graphenexpo.net](http://www.graphenexpo.net) and [www.ultrawire.eu/expo](http://www.ultrawire.eu/expo)

**14:00** End of day

## UltraWire Workshop & Graphenexpo 2022 Conference – Speakers



**Dr Julio Gomez Cordon** (*Speaker*)  
CEO  
Avanzare  
Spain

**Dr Julio Gomez** is the President of the Board of Directors of Avanzare. B.S. degree in Chemistry from Universidad Complutense de Madrid (1995) receiving the best B.S. degree in Chemistry in 1995. Ph.D. in Chemistry (2000) from University of La Rioja, best PhD degree in Science and Technology award from the years 1999-2000. Postdoctoral researcher position in the Laboratoire de Synthèse Organique, University of Nantes-CNRS. He has received the National Award Entrepreneur of the year 2008 in Spain by the ministry of industry. Best SME from La Rioja in 2019, NANOAWARDS 2008 (USA). F&S best practices award in innovation 2013 (UK) for graphene composites. Finalist of the National Awards in Excellence 2013 and finalist of Innovation in SME awards 2018. Member of the Executive board of the Chamber of Commerce from La Rioja from 2010. President of the Innovation Committee of the Chamber of commerce, from 2010 to 2018, President of the Education and employment Committee of the Chamber of commerce from 2013. He is member of the Social Council of La Rioja University elected by the Regional Parliament from 2012. He is member of La Rioja region R&D committee from 2010. Member of FEDER committee from 2013. Member of the Secondary Education Committee from La Rioja region from 2013. He is the president of the Spanish Graphene Alliance. Inventor in 12 patents all of them under exploitation or licenced. Author of 71 papers and 7 books.



**Dr Amaia Zurutuza** (*Speaker*)  
Scientific Director  
Graphenea  
Paseo Mikeletegi 83,  
20009 - San Sebastián, Spain

**Dr Amaia Zurutuza** received her Ph.D. degree in polymer chemistry from the University of Strathclyde (Glasgow, UK) in 2002. From 2001 to 2003, she was a Postdoctoral Research Fellow working in two European projects related to molecularly imprinted polymers. In 2004, she joined Ferring Pharmaceuticals (previously Controlled Therapeutics) where she worked in the research of new controlled drug delivery systems as a Senior Polymer Scientist. Her contribution led to the granting of three patents in novel biodegradable and biostable polymers for the controlled release of active

compounds. In 2010, she became the Scientific Director of Graphenea. At Graphenea, she leads the research and development activities on graphene-based materials. Since joining Graphenea, she has so far filed for eleven patents and published more than 68 publications in peer reviewed journals, including Nature and Science. Principal Investigator in 21 EU FP7/H2020 funded research projects, 16 collaborative projects including the Graphene Flagship and 3 people training network projects. In addition, she has also given more than 48 invited talks in international conferences. Her research interests include the synthesis, characterization, and future industrial applications of graphene..



**Dr George Maistros, (Speaker)**

Technical Director  
ADVISE-DETA  
34 Castle Rd.  
Bedford MK40 3PJ, UK

**Dr George Maistros** is the Technical Director of ADVISE-DETA and he is responsible for the innovation activities of the company. He is a Chemical Engineer from National Technical University of Athens and has received his PhD in Advanced Materials from Cranfield University in 1991, focusing on the dielectric cure monitoring of thermoset resin systems. He has over 25 years of experience in researching and promoting dielectric sensing systems for a wide range of materials and processes. He has coordinated five European industrial R&D projects on applications of dielectric technology on composites manufacturing processes. Through ADVISE-DETA he has coordinated the Innovate UK funded project GRAPHOSITE leading a consortium of 6 organisations.



**Akram Zitoun, (Speaker)**

Research Fellow  
Brunel University London  
Brunel Composites Centre  
Cambridge, UK

**Akram Zitoun** is a Research Fellow at the Brunel Composites Centre (BCC). His current work includes design, modelling and development of technologies with relation to quality evaluation of composite either after manufacturing or during service life. His expertise lies within different non-destructive methods and structural health monitoring systems. He has expertise in designing and developing systems, develop machine learning algorithms for autonomous extraction of signal of interest and applying technical knowledge to evaluation the health of structures.

Akram gathered valuable experience by working on developing innovative systems of evaluation and assessment of aircraft composite structures. He in charge of developing the technical solutions and project management.



**Dr Vahid Javan Kouzegaran, (Speaker)**

Principal Investigator at Production & Development  
Department  
Nanografi Nano Technology  
Turkey

**Dr Vahid Javan Kouzegaran** received his Ph.D. in Analytical Chemistry with his research project on the application of porous materials (MOFs) as fluorescent biosensing platform for the detection of biomolecules and nucleic acid structures. He started to work as a researcher at Nanografi in the area of the application of porous as well as carbon materials as electrode materials for energy storage purposes, specifically Hybrid Supercapacitors & Metal-air batteries. He is serving as the project manager and main technical person in two Horizon Europe project calls for developing Supercapacitors and Metal-air batteries and is charge of the industrial scale synthesis and production of Graphene Oxide, Reduced Graphene Oxide and a range of Nanostructured materials and dispersions.





**Prof. Park Joung-hu** (Speaker)  
 Department of Electrical Engineering  
 Soongsil University  
 Sangdo-ro 369, Electrical Engineering  
 Dept. Soongsil University, Dongjak-gu, Seoul  
 06978 South Korea

**Joung-Hu Park** (S'02 - M'06 – SM'13) received his B.S., M.S., and Ph.D. from the Department of Electrical Engineering and Computer Science of Seoul National University, Seoul, Korea, in 1999, 2001 and 2006, respectively. He is currently a Professor at Soongsil University, Seoul, Korea. From August 2004 to August 2005, he was a visiting scholar at Virginia Tech. Blacksburg, VA, USA, and from July 2015 to June 2016, he was a visiting assistant professor at University of British Columbia, Vancouver, Canada. His current research interests include the analysis of high frequency switching converters and renewable energy applications.



**Prof. Anna Boczkowska**, (Speaker)  
 Scientific Director  
 TMBK Partners Sp. z o.o.  
 Poland

**Prof. Anna Boczkowska** has 30 years' academic and research experience at Warsaw University of Technology. She graduated from the Warsaw University of Technology, Faculty of Materials Science and Engineering, and received her PhD in 2000, D.Sc. in 2011, both at the same Faculty. Since 2018 she is full professor of technical sciences. Her professional experience is related to material sciences, especially composite materials, polymers, nanocomposites and smart materials. With TMBK Partners since 2013 as scientific director in several EU-funded projects on aeronautics and materials engineering performed under EU FP7 (ELECTRICAL, SARISTU), EU H2020 (PLATFORM, OASIS). Key competences: research and development of new materials, project management, extensive technical knowledge, international collaboration.



**Dr Bojan Boskovic** (Speaker and Organiser)  
 CEO, Cambridge Nanomaterials Technology  
 14 Orchard Way  
 Lower Cambourne  
 Cambridge CB23 5BN  
 UK

**Dr Bojan Boskovic** is the Founder, Managing Director and Principal Consultant of the company. He has more than 20 years of hands-on experience with carbon nanomaterials and composites from industry and academia in the UK and Europe. Previously, he worked as a R&D Manager at Nanocyl, one of leading carbon nanotube manufacturing companies in Europe. He also worked on carbon nanotube synthesis and applications as a Principal Engineer-Carbon Scientist at Meggitt Aircraft Braking Systems, as a Research Associate at the University of Cambridge, and as a Senior Specialist at Morgan Advanced Materials. During his PhD studies at the University of Surrey he invented low temperature synthesis method for production of carbon nanomaterials that has been used as a foundation patent for the start-up company Surrey Nanosystems. He was a member of the Steering and Review Group for the Mini-IGT in Nanotechnology that advised the UK Government on the first nanotechnology strategy policy document. Dr Boskovic was working as an advisor for the European Commission (EC) on Engineering and Upscaling Clustering and on setting up of the European Pilot Production Network (EPPN) and European Materials Characterisation Cluster (EMCC). He has experience in exploitation and dissemination management on a number of FP7 and H2020 European projects, including UltraWire, NanoLeap, OYSTER, M3DLoC, Genesis and nTRACK. Also in UK Government InnovateUK funded projects, such as UltraMAT and GRAPHOSITE He is also a leader of

two private membership based consortiums: Nano-Carbon Enhanced Materials (NCEM) and Advanced Materials for Additive Manufacturing (AMAM).

## UltraWire Workshop & Graphenexpo 2022 Conference – Exhibitors & Participating organisations

Nanografi Nano Teknoloji Anonim Şirketi

Web: [www.nanografi.com.tr](http://www.nanografi.com.tr)



**Nanografi Co** was founded in 2011 as a nanotechnology startup that manufactures and creates a market for critical nanomaterials such as carbon nanotubes (CNTs) and graphene. After successfully producing various types of CNTs, we began to explore the applications of different nanomaterials such as metallic nanoparticles, metal oxides, carbides, and clay nanostructures. As a result of these research and production efforts, we launched a wide range of products to the local market in the second half of 2014. In 2015, the demand in the local market increased, and our company began to develop new applications of nanomaterials according to our customers' needs, from new-generation lightweight materials to high-performance composites for aircraft. At the same time, the miracle material "graphene" and its various derivatives were successfully launched on the market.

TMBK Partners Sp. z o.o.

Web: [www.tmbk.pl](http://www.tmbk.pl)



**TMBK Partners** is an R&D company specialised in providing solutions for producers of polymer composite structures offering new functionalities for expanding their application range and increasing their market value.

- We manufacture ultralight nonwovens (veils) based on thermoplastic polymers, carbon nanotubes and other fillers whose introduction into the composites' structure improves the electrical, mechanical and thermal properties.
- We offer services for the development of processing and testing conditions for plastics with fillers, including nanofillers.
- We provide expert opinions in the field of metallic, ceramic, polymeric material and composite engineering.
- We participate actively in European research projects which offer us access to the latest technology and product solutions.

Graphenea

Web: [www.graphenea.com](http://www.graphenea.com)



**Graphenea**, a technology company founded in 2010, is a world leading graphene producer. The 25 employees in Graphenea work on contributing to the successful development of Graphene applications of our customers, in a wide range of sectors and in more than 60 countries in the world. Through research and innovation, we support our customers with our portfolio consisting of: CVD Graphene films, Graphene Field-Effect-Transistors chips (GFETs), Graphene Foundry Services (GFAB) and Graphene Oxides. Graphenea's facilities are located in Spain (San Sebastián) and USA (Boston)



## ADVISE-DETA

Web: [www.advise-deta.com/en/](http://www.advise-deta.com/en/)



**ADVISE-DETA** is a recently formed SME that specialises in implementing advanced sensors to a wide range of material transformation processes, including polymer processing, composite materials manufacturing, mixing of chemicals and repair of structures. To this end, the company owns the IP (through transfer from ADVISE, Greece) of the dielectric monitoring system, which includes dielectric sensors, electronic measurement hardware and intelligent process monitoring software. The system has been installed in several industrial sites of advanced composites manufacturing. The business goal is to market the existing technology and establish new applications in modern manufacturing processes. The company's laboratory includes process characterisation methods (viscometer, optical microscope), dielectric measurement systems (frequency analyser, dielectric cure monitoring systems, material state based control prototype, temperature controlled sample holders) and software programming and modelling tools (LabView, Matlab).

## Brunel Composite Centre

Web: [www.twi-innovation-network.com/innovation-centres/brunel-composites-innovation-centre](http://www.twi-innovation-network.com/innovation-centres/brunel-composites-innovation-centre)



**Brunel Composite Centre** is part of the Institute of Materials and Manufacturing of Brunel University. The principal mission of BCC is to establish a world class research centre offering high quality research in phenomena that take place at the interface of composites to other materials. The physicochemical processes studies include processing of composites, embedding of smart structures in composites and joining of composites with other materials. BCC operates with the aim of developing a financially sustainable research facility, drawing on Brunel University's existing strengths, to complement and underpin the applied research and development activities of TWI.

## Avanzare Innovacion Tecnologica

Web: [www.avanzarematerials.com](http://www.avanzarematerials.com)



**Avanzare Innovacion Tecnologica SL (AVAN)** is a Spanish SME specialized in the production of nanomaterials, nanomaterials dispersions and nanotechnology-based solutions. The company is specialized in the development & commercialization of special additives, mainly for different matrices and industrial sectors: plastics, rubber, paints, paper, etc., with international presence in the automotive, aeronautic, fabric, plastic, rubber, paint and building industries, the wire & cable sector and manufacturers of household appliances and packaging wood, paper, among others. AVANZARE is the European leader in graphene and other artificial 2D nano-materials such as n-Mg(OH)<sub>2</sub>, n-Zn(OH)<sub>2</sub> and LDHs (double layered hydroxide) among other materials. With 6,000 m<sup>2</sup> of facilities and more than 300 Tm of nanomaterials produced in 2018, AVAN has become one of the top 3 producers of nanomaterials in last decade.

Soongsil University



Web: <https://eng.ssu.ac.kr/>

**Soongsil University's** roots trace back to 1897, when Dr. W. M. Baird, an American missionary started teaching from his residence in Pyongyang. Soongsil was then given the title of the first university in Korea. Later during the Japanese occupation when Korea lost its sovereignty, Soongsil University made national liberalization its top priority and took the lead in the national independence movement. In 1938, the school even decided to close itself down in protest against forced worship at Japanese shrines. Even throughout Korea's tumultuous history, Soongsil has always striven to be the first.

Soongsil University is pursuing global competitive power through specialization. As highly qualified faculty and unique educational programs are customized for each department with alliances between businesses and other universities worldwide, Soongsil is able to meet its goal of producing much needed global talents. It nurtures men and women of faith and ability by building on its long-standing strengths. Thus, it makes giant leaps towards a brighter future.

CodiKoat



Web: <https://codikoat.com/>

Products made extraordinary with **CodiKoat** technology. Our nanoparticle-based tech coats any surface with world record speed and duration. GOVIROL is a self-cleaning and anti-viral adhesive film that is able to inactivate the coronavirus in seconds.

W.L. Gore & Associates



Web: [www.gore.com](http://www.gore.com)

**W. L. Gore & Associates** is a global materials science company dedicated to transforming industries and improving lives. Since 1958, Gore has solved complex technical challenges in demanding environments – from outer space to the world's highest peaks to the inner workings of the human body. With more than 11,500 Associates and a strong, team-oriented culture, Gore generates annual revenues of \$3.8 billion.