The Greek Scientists Society
3rd SYMPOSIUM REPORT



Key Takeaways

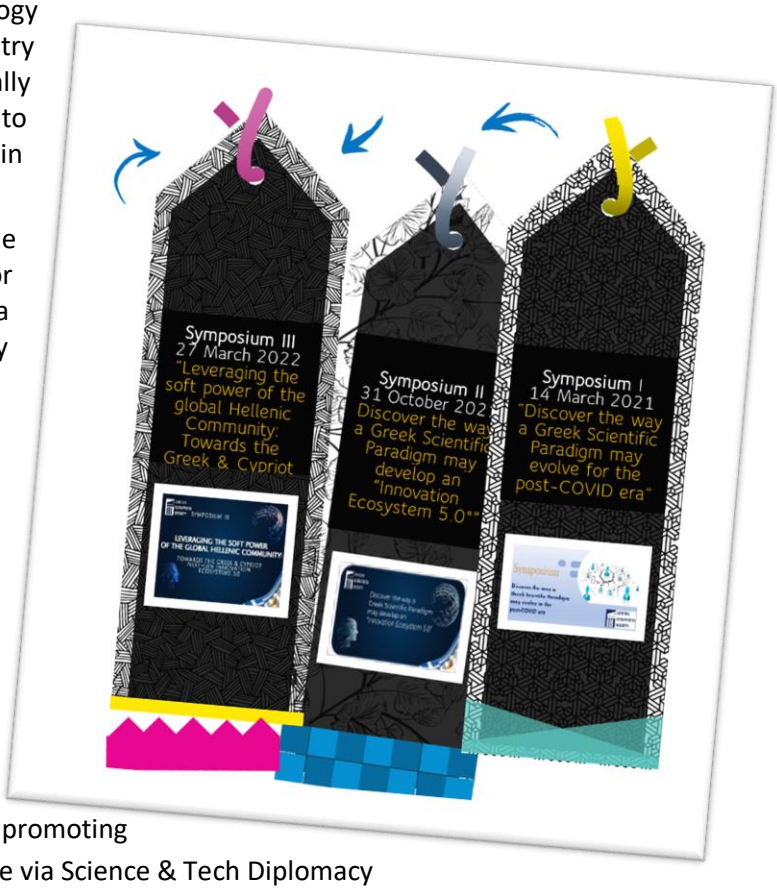
SYMPOSIUM REPORT

On March 27th, 2022, the Greek Scientists Society organised its 3rd Virtual Symposium on "*Discover the way a Greek Scientific Paradigm may develop an "Innovation Ecosystem 5.0"*" following last October's Symposium *"Discover the way a Greek Scientific Paradigm may develop an "Innovation Ecosystem 5.0"" -* where we discussed how the Greek Scientific Paradigm may take flesh and bones and how be developed within the boundaries of the next-gen Innovation Ecosystems, embracing the pursuits of industry 5.0 and realising the prospects of society 5.0 - and the first one of March 2021 *"Discover the way a Greek Scientific Paradigm may evolve in the post-COVID era" -* where we endeavoured to set the foundations of a Greek Scientific paradigm based on ancient Greek thinking and principles.

In the new era, Innovation in Science and Technology is the spark to transform a Nation - within the Industry & Society 5.0 context - into a technologically advanced one, small countries like GR and CY need to use all the necessary means to become successful in that front.

Our Diaspora is frequently mentioned as a game changer for helping Hellenism find its position for the time to come. It is perceived to be, and it is a soft power that we have to incorporate in every arrangement we compile for the future.

In this 3rd Symposium we build upon the very interesting ideas that came out of our previous Symposia – Tech Diplomacy and Involvement of Scientists in Diplomatic actions – that must be further nurtured and advanced to the next level, take shape and developed in to action programs.



Eighteen prominent Speakers from the Academia, the Industry, and the Public Domain discussed these matters, with the aim

- ✓ To identify the role of Scientists in promoting our position in the global landscape via Science & Tech Diplomacy
- ✓ To combine the wealth of experiences and capabilities of our Diaspora
  - ↳ to incorporate our distinctive talent in Life Sciences to the dawn of the Greek Biopharma innovation
  - ↳ to set up and build momentum for a Tech Innovation Ecosystem in GR and CY

Note

A lot of interesting ideas came out of our Symposium that must be further nurtured and advanced to the next level, to take shape and be developed into programs with solid results for the whole Ecosystem and especially for the Scientific Community

The Program

The Symposium opened with the welcome message from Theo Zacharis, founder of the Greek Scientists Society and the opening speech of the Keynote Speaker Professor Joseph Sifakis on "For a national innovation strategy - Vision and Implementation"

Welcome Speech Watch the video (click on image)



Theo Zacharis
Founder of the Greek Scientists Society





Watch GSS Initiave Presentation

Key Takeaways

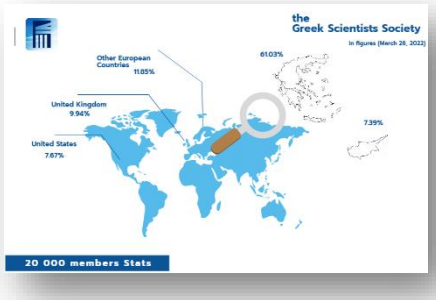
- Our ultimate aim is to bring into the centre of our Society the **Scientists** and **Technologists** as the genuine carriers of **generating scientific breakthroughs and ground-breaking technologies** but also the **young entrepreneurs** and **intrapreneurs** that will realise the future innovations for the benefit of the society.
- It seems that we enter a new era of geopolitical turmoil, we need to be ready as a Society to tackle with unforeseen threats especially in the form of actions by totalitarian regimes. In case of a battle, we all rely to Scientists & Technologists to **shield** us from the external threats protecting and preserving our ideals of democracy and open market, and our way of life, prevailing in this fighting.
- In this 3rd Symposium we proceed from **abstract notions** – Greek Scientific Paradigm & Innovation Ecosystem 5.0 - to more **practical issues**, like developing an ecosystem on space economy and the Aerospace & Defence, keep momentum for a GR and CY Tech Innovation Ecosystem and how to incorporate our distinctive talent in Life Sciences to the dawn of the Greek Biopharma innovation

A few words on the GSS

- We have reached the 20ooo members' mark which successfully indicates the completion of Phase I creating a critical mass of Scientists & Technologists in GR, CY and in our Diasporas
- By reaching this goal, the GSS is the **largest global Hellenic network on LinkedIn**, the main social network for professionals.



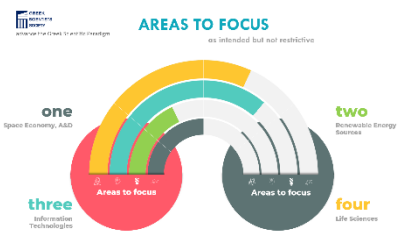
- Our Objective is to Facilitate and Nurture the **Next Gen of Innovation Ecosystem 5.0** for Scientists & Technologists to Deliver the Solutions for the New Era all the way from Lab to Scale-up and Beyond
  - we plan to develop an **AI Computing Platform**
  - to develop **Innovation Ecosystems**
  - to organize the **global Hellenic Science & Technology network** in the form of **Scientific Amphictyonies**
- Here are some indicative data for the 20K network



Professors	3327	16.64%
Researchers	4300	21.50%
Hospital Doctors *	1350	6.75%
Medical Doctors *	2169	10.85%

- Areas to Focus

(not restrictive ones)



(*) A profile may be listed in both categories

The Symposium opened with the welcome message from Theo Zacharis, founder of the Greek Scientists Society and the opening speech of the Keynote Speaker Professor Joseph Sifakis on "For a national innovation strategy - Vision and Implementation"

Professor Joseph Sifakis, Keynote Speaker of the Symposium, on "For a national innovation strategy - Vision and Implementation"

Professor Joseph Sifakis

Speaker bio Watch the video (click on image)





Download Presentation

Key Takeaways

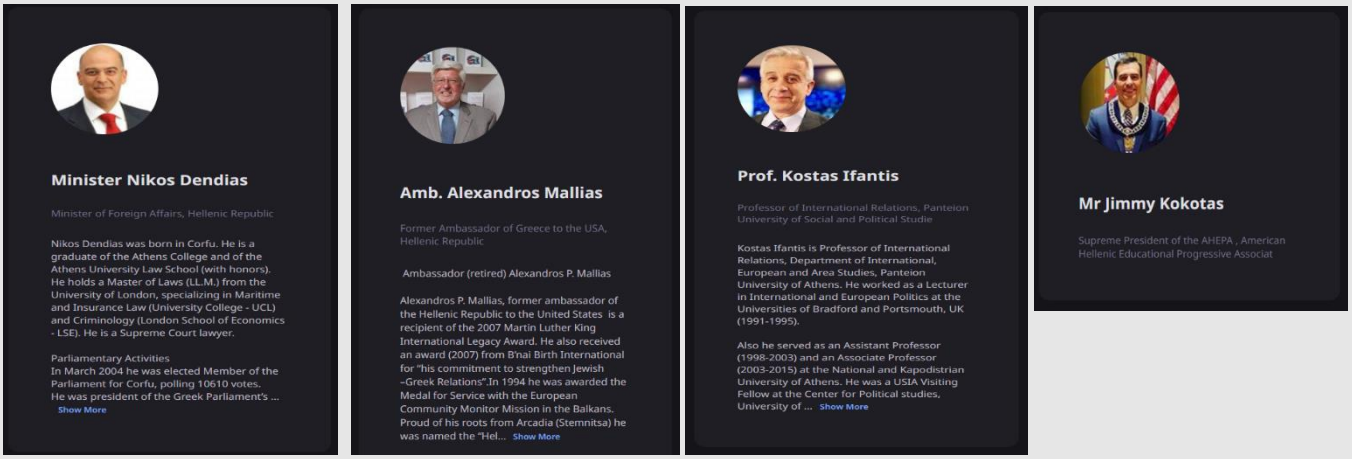
- Innovation is just a **buzzword** in programmatic **wish lists**. Innovation turned to be the **engine** for **economic growth** at the end of the 20th century when large companies developed R&D from basic research to applied research and development. In the field of ICT, we have **famous industrial laboratories** such as AT&T Bell Labs, Xerox Park, IBM that have brought together an impressive number of **Nobel laureates** and **renowned engineers** who advanced the field
- In the 1980s, there was the convergence between University research and corporate R&D with the emergence of **innovation ecosystems** that bring together three types of players: **large companies, centres of excellence and start-ups.** The secret sauce of their success is the synergy between all the factors including **research**, **technology transfer, industry adoption, investment,** and **venture capital**.
- Small countries like Israel, Switzerland, judging by the number of IP & patents held, Taiwan global leadership in chip manufacturing and the Scandinavian countries may serve as models for Greece.

For a Greek Innovation Strategy

- The **importance of the human factor** is completely neglected by government policies and practices. The deficit of vision and ideas, and of moral values cannot be compensated by material goods. We must restore **meritocracy** and belief in the common good
- Radical reform of the research system in two directions: **Critical Mass** and **Excellence**. The research landscape in Greece is very **fragmented**, with universities, institutes, and other institutions. Breakthroughs in R&D require **multidisciplinary knowledge** and research supported by experimental evidence. They require a **combination of skills** ranging from basic research to applied research and development. The available research potential should be restructured, for example on a regional basis: **4 regional Centres of Excellence** with **strong governance**.
- On **excellence**, since the workforce market is global, Research and academic careers should become more attractive with superior salaries, avoid a bureaucratic, rigid and unfair system in an open environment with international collaboration with the best research centres abroad, especially with the huge academic potential of the Greek diaspora, such as Israel and China did.
- The government should develop R&D programs targeting sectors of national interest such as **defence and space**, **agriculture** and **food**, **shipbuilding** and **equipment**.

Panel 1. What is the role of Science and Tech diplomacy in today's world? how the Scientists can promote our position in the global landscape?

Speakers



Watch the video (click on image)



Moderator: Mr Dimitris Apokis



Key Takeaways

Minister Nikos Dendias (*due to unforeseen changes in his schedule, Min. Dendias send a message*)

- Science and Technology in today's world are evolving as a source of **soft power** to strengthen or foster international relations, thus constituting an important **tool of diplomacy**
- Today no country can tackle **current global challenges** such as the COVID-19 pandemic, climate change, cybersecurity, emerging technologies etc. challenges alone, thus their foreign policy needs to integrate new tools for a world of increasing **scientific** and **technical complexity**
- As humanity's greatest challenges - and some of its most promising opportunities - are **regional** and **global**, increasingly, the world requires effective **partnerships** between **Scientist s, Engineers**, **Policymakers,** and **Diplomats**.
- It is therefore essential to develop our own network of **Scientific Advisers** and **Consultants** in fruitful cooperation with our **Embassies** and **Consulates** abroad, promoting the Greek ecosystem in **science, technology, innovation,** and **higher education**.



Former Ambassador Alexandros Mallias

Amb. Mallias was not able to connect due to technical problems. He shared his thoughts in written.

- *Allow me to confess at the outset that I am not a leading expert on Tech Government or even Tech Diplomacy. Nevertheless, based on my eight-year diplomatic service in the United States including a four-year term as Ambassador to Washington I will spare you from useless lessons of deontology. I will limit my remarks in four points:*

- *A. The success of our common endeavours depends on four conditions: visibility, synergies, interoperability, impact measurability*

- *B. Endemic, epidemic, ultimately becomes pandemic. Delta, Omicron. It sounds Greek to all. The Greek language is back. It is even more important because it not the outcome of a Hellenization campaign. A cataclysm of words with Greek etymon –etymology- is nowadays used as the best available tool for understanding and analysing scientific and societal symptoms and their causes. Meta replaces FACEBOOK.*

    - *First Proposal: Get them in; insert the maximum possible of Greek glossary in the official texts and current political statements. Greek language may also be a useful means in re-branding Greece.*

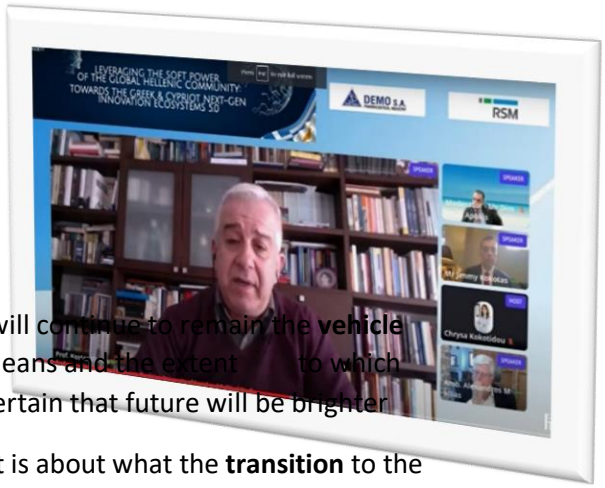
- *C. I doubt if it is advisable. Even so, there is no need of a central command for commanding the ecumenical gnosis advanced and propagated by Greek Scientists (archons of episteme). Better avail of the e-learning and e-acting to get the maximum possible impact. If a kind of coordination centre in Greece is needed, I will offer to you two options: 1. Link the portal with the Ministry of Digitalization and e-Governance. Professor Stamatis Krimigis assistance may be a catalyst in this regard. 2. Interact with Minister Dendias or Mr. Fragogiannis, Deputy Minister for Economic Diplomacy and Openness. They are well placed to grasp the needs and merits of such an operation.*

    - *Second Proposal: If needed, establish an e-contact point (portal) with the said Ministries of the Government of Greece.*

- *D. The more we act and operate individually or as micro cells of an ecumenically spread Hellenic eco-system, the more we will need to be active in the social media. We need, Greece needs, a more focused presence, support, and campaign. From eponymous individuals and Scientist s.*

    - *Third proposal: Let's not expect or anticipate much from the Government and Governmental agencies, Embassies around the globe included. In times of crises in particular everybody and everyone is needed. Informing, containing, and countering. Tweet, Meta, and LinkedIn, etc. Your posts in support of Greece and Hellenism are extremely useful*

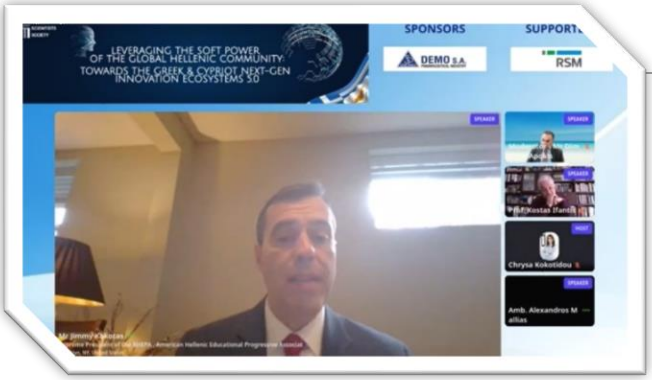
    - *Last but not least, try to connect and interact with the Delphi Economic Forum (Mr. Symeon Tsomokos). They have a great impact.*



Professor Kostas Ifantis

- **Education** for Greeks all over the world has been and it will continue to remain the **vehicle** for **social**, **political,** and **economic advancement** by all means and the extent to which there is a **collective will to improve education** then it is certain that future will be brighter
- On the international state of play and the current juncture, it is about what the **transition** to the **next wave of post-industrial revolution** entails and what are the challenges, the issue is not one of what we can do as scientific or academic or political elites or community but a **strategic imperative** that we **don't miss out the wave of technological evolution** as a matter of **survival**
- There are **numerous issues** that need to be addressed like democracy, populism, violence, political and religious extremism that linked and affected by the way **technology** and **innovation** changes our **societal economic** and **political condition**
- A UN report (2016) pointed that while **automation innovation** in machine learning **threatens** 47% of all jobs in the West, in the developed world up to 80% in China results in a lot of personal upheaval, so in GR and CY the transition will be some say, brutally difficult. Our **survival** and **progress** and **development** depends on **adaptation to change** and governments must have the means to adapt. That's why we need a **human capital** that is attractive to funding. Those that cannot afford to invest in new technologies and in the education will see their economies lose their competitive edge and they will be **marginalized** in the **global diplomatic arena,** they won't produce growth and jobs and they will leave the state without revenue to invest into the future
- There is also a need to invest in the **process of training** to use the new technologies, to have a strong education system from early childhood to **higher education** so not to be **left out**
- A political remark that has to do with the sense of belonging, governments both in GR and in CY must **minimize** inequality, not inequality of income but **inequality of opportunity** as a viable path toward a better life; education is the only way that we can chart or map out in order to remain part of the **global distribution of power** in an advantageous way
- **Soft power** can be of critical importance but only as a **compliment** to hard power which is there not to be used. Soft power cannot do much against **revisionist** actors like Russia or Turkey as long they are not satisfied by the global distribution of power. Soft power because it is a commodity that is very much in demand in these parts of the world, not elsewhere where they use the threat of exercising **coercive diplomacy** or the threat of **exercising hard military power**
- Soft power is extremely important but it is it is a currency to be used **in peace time**. we should rediscover and re-evaluate our common **roots**, **heritage**, our commitment to **democracy**, our commitment to a **liberal paradigm** and **to human rights** and the **peaceful resolution of conflict**.
- As long 80% of R&D is the product of the human brain and only 20% is manufacturing then there is scope and there is room for countries who can **invest in education**. We are in a privileged position to participate in a scientific collaboration in the European Community and it is important in terms of a national strategy that Greek research communities in GR, in CY and abroad to **integrate** to the **multinational academic communities** that will bring us at the forefront of innovation and technology leading to an **excellent diplomatic asset**

- It is tough luck that following the pandemic we have the war but nevertheless JP Morgan, Amazon Web systems and Microsoft have invested in Greece, so things are looking up and if we are **resilient** and **persevere** and if investments are successful then this will have a multiplying effect



Mr Jimmy Kokotas, Supreme President AHEPA

- AHEPA has many relations within the Greek American Diaspora including Professors at many Universities – **help fund Hellenic studies** programs to promote the language and the culture - a very strong community in America that obviously the **Scientists** , the **Professors** and the people in **Academia** have a **platform** within the academic circles, so they do have a stage to be able to **get a message across** and to help with **the spread of diplomacy**; GR and CY Scientists are very well respected in the States.

- Scientists help with the **message of peace** and that message of **diplomacy**, the advancements that are being made in the world are for everyone; even poorer countries that may not have the financial leverage enjoy the goods of Science & Technology, whether it's the internet or it's medicine, Scientists have an absolutely wonderful platform to spread that message and tend to unite all, even the not so peaceful ones for the **sake of having access to human genius**

- Scientists have a great role to play and have **leverage** with their advancements to **sit on the table**, we'd like you to be better **stewards** of the world and of the people

- As an organization with conventions - district conventions national conventions, internet presence - we **welcome** our Greek and Cypriot brothers and sisters that are in the science and technology field, we're more than happy to **give them a platform** to share their ideas, their vision and what they think the future might hold, and we support them in any way that we can be **advocates** for both GR and CY, promoting the next ecosystem through our **fraternal order**, through the **AHEPA family,** through our connections here and our friendships that we've established with our **over 400 chapters** with local government to work together for the common cause with people that don't necessarily care about who's going to get the credit but they're just trying to make a difference

- The beauty of technology and science when it is approached from a **compassionate perspective** versus a for-profit perspective as an organization, a service organization that we are all we do is try to get involved to **help and give in our communities**, there's so much out there that that we that we could do and our organization which is celebrating its 100 year anniversary this year, is proud to continue to stand and advocate for GR and CY and Diaspora

- Unlike the first generations that we used to try to Americanise them, now 2nd or 3rd generation Greeks or Greeks that recently moved to the States start searching other Greeks to commit a "parea". But now there is a lot of potential in Greece in the business side of the conversation, we can do so much, whether it's in the **incubation** side of technology whether on an academic perspective are a lot of things working in Greece's favour - peaceful country, a democratic country, great quality of life

- People always **change history to their benefit** and that's why as we just celebrated March 25th and the 201st anniversary of Greek independence to bring attention to ourselves. The world

remembers who you are and the contributions you've made. 1821 is far away but 1940 is not. Everybody living's parents or grandparents were alive in 1940 with the famous OHI so the Greeks have helped shape the world. The famous saying is "**history teaches you nothing it just punishes you for not learning its lessons**" and if we don't learn them, we will obviously make the same mistakes going forward

- The way things have evolved in the States the last couple of years and how technology has now become so quickly to adapt and adjust with covid but also how transient it has become due to covid, GR and CY need to formulate a strategy going forward how to **attract** some of the US companies - democratic nation, great quality of life, safe country, very low cost of living

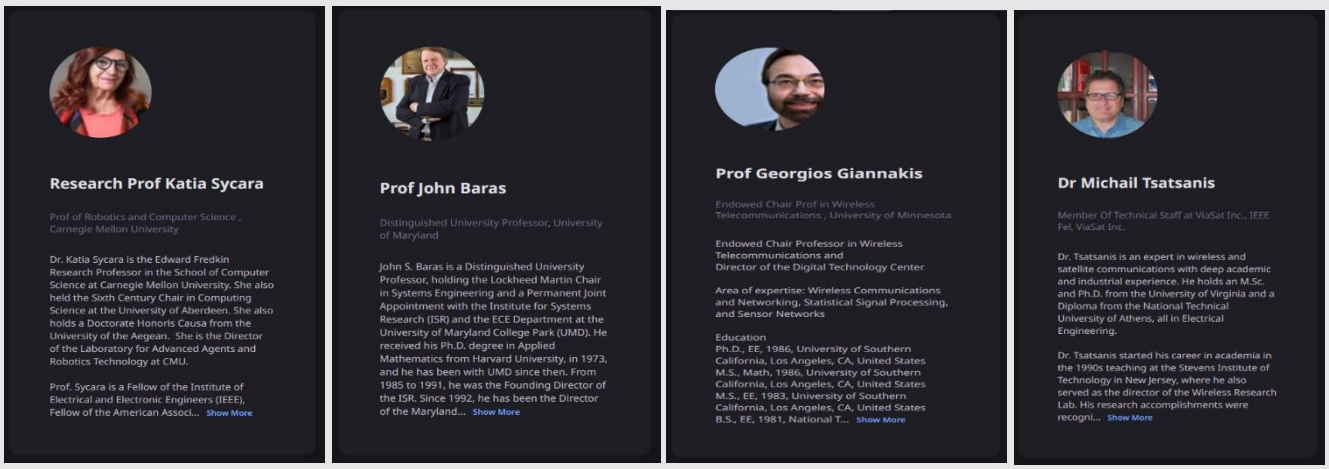
- I will use a **construction analogy** of the way things used to happen in Athens; somebody owned a piece of property and they'd give it to a developer to build and they'd get a nice brand-new apartment out of it. So, GR and CY need to figure out how to bring in these companies offer them what they need to establish what they need to make the barriers as low as possible and as easy for them to overcome and create new jobs

- You have a Prime Minister who has worked in the States and in business, who knows what it's about trying to implement strategies and if we can get a couple of pieces in place and get a few of those companies to come in it'll be wonderful because it will be a snowball effect

- **George Yancopoulos** who everybody should have heard of Regeneron is a not only a proud Greek but he's the son of a brother who is extremely active within the AHEPA Organization, so we take pride in George because we consider him one of our own, because of his father's contributions to our Organization and so many people like him, we mentioned **Albert Bourla** and there's so many other people in technology and science. These people would be more than happy to play a role in Greece's rebirth and resurgence of Greece and Cyprus through science and technology. With that strength advances our soft power and our diplomacy because there is power in technology and can bring **respect** and **legitimacy**

Panel 2. Bringing Greece & Cyprus to the forefront: Should we develop an ecosystem for the emerging space economy, and the A&D sector?

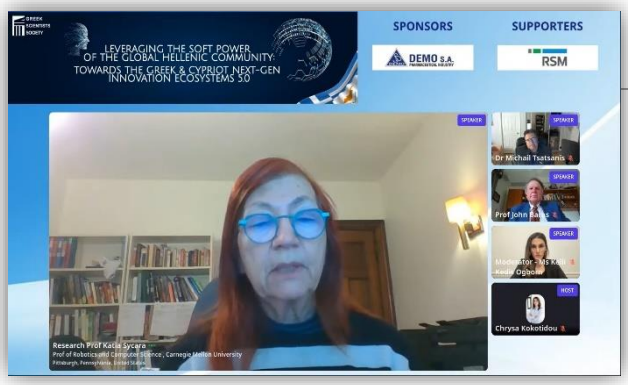
Speakers



Watch the video (click on image)



Moderator: Ms Kelli Kedis Ogbon



Key Takeaways

Professor Katia Sycara

- Areas of applications in space include: **telecommunications**, advances in **satellites** and space vehicles, construction, manufacturing, **health entrepreneurshi**p, **entertainment**, **tourism** and many others, this is a large variety of opportunities.
- As we know **space belongs to everybody,** each country has to choose their opportunities and core competencies to compete on
- Some examples that GR and CY have core competence and opportunities that do not **require heavy investments in hardware** but they are mostly **software** based and IT based -where

brain power is required rather than heavy investment in infrastructure and where science already exists and so that we have **proof of concept** as well as Greek Scientists abroad are already involved in some of these areas

- Although these technologies are aimed to be used in space they are also significant for the earth. Examples from three areas: **food production**, **environmental monitoring**, **healthcare**
- **Indoor agriculture** - the world's population is going to be about 9.7 (please confirm) billion by the year 2050. Food production is totally inadequate to meet this demand not to mention climate change that is exacerbating this situation. Indoor food production techniques are being developed – requires no soil with a limited amount of water and limited space. Indoor agriculture is based on **plant science environmental control** and **data mining** to improve yields; some encouraging results, a two acre indoor farm has same yield as a 720 acre farm (for leafy vegetables but are starting other crops, for example potatoes as significant targets
- **Renting space in satellites** rather than developing satellites which is very expensive for environmental monitoring for example. By developing **imaging technologies** to used on satellites that specialize on applications like **aquaculture** or **agriculture** to develop techniques for **fusing satellite imagery** with **sense data** from **low flying aircraft** (for **climate monitoring**, **disaster relief**, **military applications**, **fire fighting** and **wildfire suppression)**
- **Healthcare applications** that are brought out by **space travel** and **develop new therapies**, specialized **clothes** to minimize work injuries – e.g. the **roboglove** technologies
- How can we facilitate development in such industries? we need **cooperation of academia-government-industry.** Academic institutions connections with industry, so Universities need to develop **Technology Transfer** (TTO) - evaluate research for its **patentability** and **transferability** for industry and help inventors with patents navigating all these bureaucratic things and rules and regulations for **patents royalties** other useful contractual terms - and **Strategy Connections** offices (SCO) - facilitate joint academia industry **workshops**, industry visits to Universities, act as conduits of **information** and **relevant research**. **Student capstone projects** and **internships** in national and international industries should be introduced
- On the other hand the **government** can have programs for example **research calls** addressing **different research maturity levels** such as fundamental research, applied research, mature research, immediately deployable research with different amounts and duration of funding.
- Second suggestion is that a government can have specific programs for small business innovative research so called **Space-Based Infrared System (SBIRS)** in the USA for concrete topics where small companies **get awards for R&D**; the candidates companies need to have credible technology transfer plans after the initial 3 to 4 years funding
- Another idea is to have **matching sites** on the Web that are **sponsored by the government** to bring together **technology developments** with **technology product actors**
- The sectors that Greece need to prioritise are agriculture and aquaculture, health there are many different applications inspired from space but there are many different applications, in terms of **algorithms technology** for a **trustworthy autonomy**, in AI in finding algorithms for basically **trustworthy validation**, **verification of neural networks**, in ai neural networks for **vision** and for other **deep reinforcement learning technologies,** for **sequential decision**

making and so on and these are very challenging things that require algorithmic and mathematical thought and then they could be transferred with **royalties**

- One other aspect of sustainability, maybe it's included in the social ones, it is **educational sustainability**, we need to educate and keep our scientific personnel and in advance of the of what is happening elsewhere
- A lot can be done with collaboration of through our Postdoc Students with different exchanges in other words and **continuing education** in other countries that already is happening and encouragement via **research institutes and research infrastructure** is for people to return and or continue because then internationall collaborations are done



Professor John Baras

- Why Aerospace and Defence industry? to me both are challenging and often extreme environments so as a result, history will show that they often **push Scientists and Engineers to the frontiers of innovation** in both science and technology leading to dual use products, commercial and defence. I will discuss four technologies that I believe currently are the most promising in this Aerospace and Defence (A&D) sector
- The first one is **global broadband communications** and **data services** everywhere, anytime for all; providing communications to everybody is the last two years old. How now we do that? by integrating terrestrial wireline, terrestrial 5G and 6G and beyond, wireless and satellites both GEO and LEO, that Dr Tsatsanis mentioned
- Now we have to have **effective real-time management** of communications and **sensor networks** via **virtualization** of the entire network - through technologies such as **software defined networks**, **network function virtualization**, **dynamic resource allocation of bandwidth dela**y and **topology** - meaning serve dynamically changing number of users with dynamically change in demand with dynamically changing perhaps sometimes ultra-low latency and other applications
- A major example of that is to support **autonomous driving** for instance or **autonomous trucks** and then another trend that comes from A&D is developing **private 5G and 6G networks** (restricted networks that you have more control over them) and develop **interoperable virtual environments** there will be many virtual networks that they have to interoperate like the problem in wireless several years ago
- Second technology, many of these progression systems in this sector they are traditionally extremely complex with many tech components and functions heterogeneous etc, and that's why the so-called **system science and engineering** which is flourishing again actually started from A&D and its aim is to conquer the complexity and develop methods, Environments, and tools for as broad set as possible of engineers, Scientists , and developers meaning not just advanced theory and methods but **usable methods**

- How do we do that? we have to develop **integrated modeling tools** we have to develop **interoperable system components** from all - currently these have been stored in databases all over the world in different forms we have to develop efficient methods for **fast rate of analysis and design space exploration** including things like **material selection** and **geometry** and develop efficient methods and tools for **verification**, **validation**, and **testing** and then we need to integrate **data-driven methods** like **machine learning** and AI with this model based techniques and we have to address this for the **whole product** or **system lifetime management**

- Third technology is **autonomy** and this now go to anywhere from **autonomous cars** to **medicine** and **healthcare** and so on so forth, and we also go to develop this **autonomous programmability** or **management of networks** which is called **autonomous network and programmable things.** An important current trend in this area, is **trusted autonomy** - autonomy for which you can guarantee something about and this means that we need to **quantify autonomy** and we need to provide methods to guarantee **safety** and **assurance.**

- Further complications and challenges in trusted autonomy for **human and robot collaboration** in this sector we have **autonomous programmable networks**, **communication sensors**, and others, and the last technology that again comes from this sector is **security** and **trust** and how we are working on **blockchain** and **private blockchain technologies**, **private communication data networks** that came from the military, allocate some **security functionalities to hardware** and the physical layer and develop methods and products and a **password-less world**. Then we need to develop **quantitative methods** for adaptive trust and privacy, we need to exploit the **wireless medium** for **advanced security**

- Why the four technologies they are relevant and what one can do for Greece? we need to emphasize these technologies for **5G, 6G satellites for communications** and alleviate the **digital divide** as already mentioned these technologies help in **environmental monitoring,** in **agriculture**, in **manufacturing** and also in revolutionizing education.

- Second, use of these technologies can strengthen the so-called **heavy industries** of Greece which is **tourism**, **agriculture**, and **merchant marine** in ways that have not been done so far

- Third, use of these technologies in addition 3D Printing lead to **democratized manufacturing**, bring manufacturing to any neighborhood and every area in the world and that means going from things that are called today **maker spaces** to **smart manufacturing** and especially **distributed** and **geographically manufacturing**

- Fourth, use of these technologies for higher quality **hands-on education**. This has to happen not in University alone but like we do in Sweden and Germany, from **elementary school to lifelong.** In particular, we have to introduce **computational thinking to kids** from elementary school – many attribute to the fact that 20 years ago Sweden gave free laptops to every child in science in elementary school and introduce all to **metaverse culture,** meaning have to live in what we call a **networked immersed world**

- Fifth and last is, we have to build effective **Total Innovation systems** - a technical term - Universities in Aaustria, in Switzerland, in the USA, but not in Greece, in addition to **linking** the University Research **labs** with **industry**, we need to provide **training** for people to become **entrepreneurs** - you are not a born entrepreneur for the same reason you're not a born a researcher you have to be trained and trained students in bootcamps - and so on and so forth

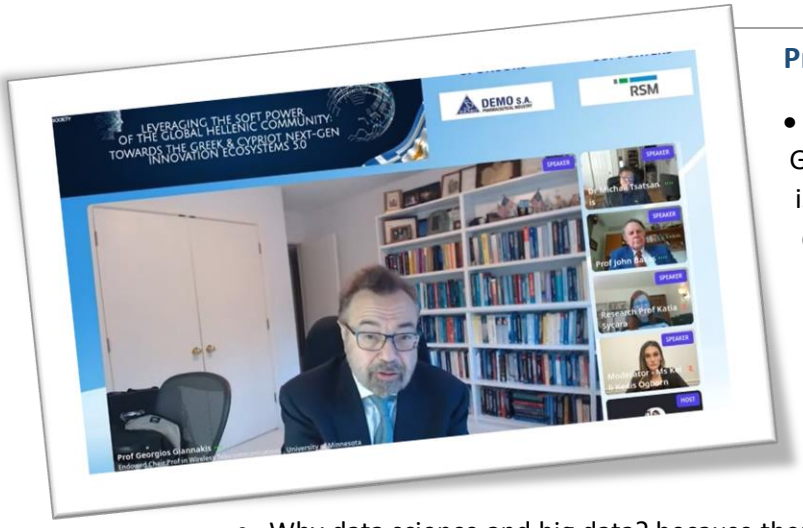
- Models of this type exist and people to help Greece exist, both in the US and in Sweden and the last one is you have to **link internationally** in many of the areas we're talking about especially in **communications** and even start **bi-national collaboration programs** as there exists for many countries already between US and Germany, US and Sweden, US and Israel, and so forth

- The sectors that Greece need to prioritise has to be grassroots and the area will put the most emphasis for Greece would be agriculture - first there's a tremendous shortage of manpower and second, agriculture is becoming totally automated can be more productive and a third point, almost 60 000 young people go to away from athens to start what is called **boutique farms** for special products

- The concept of utilizing and tapping into the existing **brain trust** and the **startup ecosystem** but also **maker spaces** how these can be better leveraged to create a robust ecosystem and for future growth there are in various parts of Greece grassroots efforts in this direction by maker spaces and others that they even led to startups, the government should support those in the non-intrusive way. I want to mention is that if we go back to agriculture and go back to the point that Professor Giannakis mentioned we call in the US, **energy water and food and nexus** meaning they **come together** and they are **essential** for **sustainability**. One of the issues here is energy and renewables which can start from local areas in maker spaces to create sensors and other things and install them and try them this was started in Thessaly several years ago. I would like to see more **desalination** plant efforts in the islands to solve the water problem, the technology exists. I would like us to use these technologies that come from this advanced defense and satellite sector to decentralize Greece, to create living like we have seen in Germany and Sweden and Austria where people go away from the big cities and live in smaller distributed towns, to create these local environments where people learn to become more **sustainable in terms of energy and food and social culture**

- Currently there is a call for a **huge european project** to integrate satellites and terrestrial wireless and so forth we participate. I was trying to find participants, there are not many so large EU projects - many of them actually give the opportunity for **Industry - University collaboration** and second there are bi-national agreements; I'm currently working to bring from offering Greece and actually even get German funding for Greek students and exchange of students. Somehow we have to get to GR and CY in these **pairwise arrangements** with all the goodies we described meaning universities industries and local environments involved from the start because what i see in Greece which is not what you need to do is great Universities and great Research Centers that they get this funding but when I ask the question what have you done for the nation and the society I don't get an answer

- I want to make a comment for the naysayers because Professor Sifakis mentioned, there's a wonderful study for the Swedish Royal Academy of Engineering that describes five small countries and their economies how they manage to do what we're talking about, so Greece can do it. There are countries with 10 million people, 3 million people that they were able to start from scratch and build the necessary infrastructure and build the environment to keep their people here without leaving us and so forth so it can be done but as Professor Sifakis mentioned the various components have to come together in synchrony and that's what's missing



Professor Georgios Giannakis

- On Information Technology ecosystem for GR and CY and around my recent interests which is **data sciences** and **network sciences**. the first question is, what issues to address in Information Technology and what strengths to play on; it has been already said that **brains** and Greek and Cypriot **talents** and research and innovation should be leveraged to the maximum especially in data sciences and network sciences

- Why data science and big data? because there are 15 billion cell phones and millions of base stations and 30 billion facebook posts per month so there is an undeniable growth in data which is about 40% every year increase but the investment on IT spending it does not exceed 10% and the projected IP traffic for 2022 is to exceed for 45 exabytes

- There is value added, people have figured that 300 billion will be gained boost in US healthcare alone which is twice the GDP of Greece, so data science and network science programs give ample **opportunities for business** but also in **education**

- We observe that there are programs and degrees all over all throughout major Universities in the world, what is desired is **leverage** the brains on **fundamental theory** and **algorithms** and **computing platforms** to ensure secure **deep learning** for **artificial intelligence** while accounting for the application domains that appear to be **more fruitful for Greek and Cypriot ecosystems** - I pose the other question how can we be contemporary relevant and adaptive to the IT thrusts – includeing AI but also cyber security and quantum computing that's the buzzword of the days - those have to address though both **regional challenges** as well as **societal needs** and **opportunities** including **marine technology**, **intelligent manufacturing** of **photovoltaics** and **wind turbines** with **satellite links** as Dr Tsatsanis has pointed out as well as **smart grid** and **energy networks** with **renewables.** As far as society needs those include **water** and **climate** and **personalized health informatics**

- The next question is what are the major guidelines to give to Universities for the next decade. Already Katia mentioned that there is a need to integrate **education** with **research** and **innovation** and **technology transfer**. One thing to be stressed and it has not been so in Greece is what people call learn by experience projects from the industry and there is a need to diversify curricula and have **inter-cross** or **transdisciplinary** research pursuits that also instill **entrepreneurship** skills and for example in the US it's very common to have offices of **technology commercialization** and **incubator hubs** next to Universities, something that could be encouraged for Greek and Cypriot Universities and the platforms should be welcoming such a transdisciplinary approach, **robotics** is one obviously, **electric transportation autonomous vehicles**, information and misinformation which is common in recent days cyber security and computing

- In creating **proactive culture** to ensure that there's a **sustainability**, looking into a UN Summit in 2005, the pillars of sustainable systems are three – environmental, economic and social sustainability. A nice example to demonstrate these three is provided by the sustainable

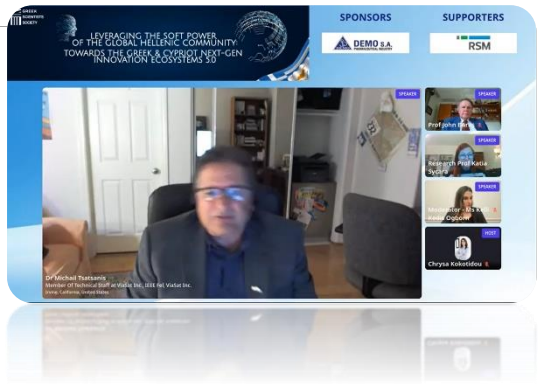
infrastructure of **power distribution networks** and the need for **alternative forms of energy** is evident with today's unfortunate war. We must integrate renewables and we must integrate consumer-driven usage what people call **demand response** and also all of this to be facilitated by an **advanced metering infrastructure**

- For environmental sustainability we need to increase the **integration of renewables** and what are renewables **photovoltaics,** in Greece micro wind farms, and plug-in electric vehicles, so by increasing integration of renewables, we minimize the footprint and of course renewables come with some uncertainty because they work they relate to weather prediction.

- The second one is economic sustainability and that will be achieved if we **proactively embrace elastic loads** such as **plug-in electric vehicles** and provide financial incentives for **demand response programs** that attempt to balance supply and demand and make sure that we make **secure market decisions** so all basically will ensure economic sustainability

- Last but not least, is the **social sustainability,** we need to promote active **consumer participation** and invest on **advanced metering technology** and at the same time use for example AI to learn consumer preferences while we preserve privacy of everybody's data, so what are the suggestions on the research side what advances can we envision in **modeling optimization**, big data analytics or learning and cyber security to enable **sustainable power distribution networks** that's one question I'm posing and what are the computational challenges that emerge with increased penetration of renewables, end-user participation and large-scale economic power markets

Dr Michail Tsatsanis



- In a very high level overview of the state of affairs in the **satellite communications industry** how we came here in the last 10 years and where it's going in the next 10 years, today we have a **pretty robust communications internet access network** that covers large parts of the globe and it serves millions of people, typically people that don't have access to fiber like in rural areas or everything else anything like in a flight you connect on the wi-fi from a network through the satellite connectivity or defense applications amd so on

- 10 - 15 years ago, communication satellite was just a tv broadcasting satellite as one giant beam cover the whole USA or whole of Europe and broadcasting television signals. With the advance of various technologies that have come together to create this very sophisticated network we have today satellites with thousands of beams, we have satellites moved to very high frequencies where there's more bandwidth and more ability for more throughput and in those frequencies we didn't even have electronics that work and so new semiconductor manufacturing processes and technologies have to be developed

- We're now moving from a different paradigm into the **low earth orbit (LEO) satellite network,** instead of having one high altitude satellite that covers a large portion of the globe now you have these smaller satellites that just buzz around the earth extremely fast at many times faster than the bullet and it just buzzes overhead off you can only see the satellite for a few

minutes so the network on the terminal on the ground has to hop continuously to different satellites to maintain connectivity to the network so you need to have thousands or tens of thousands of these satellites all buzzing around and creates a tremendously complex network

- People are looking into this 6G networks, maybe 10 years out, where we're going to have go into these extreme frequencies what's called **terahertz communications** for which actually currently we don't have **electronics** that work in this frequency and we don't have a lot of **other technologies** and **software** and **signal processing** and so on

- This digital inclusion satellites have a social purpose as well to bring everybody into the network. Regarding where Greece fits into this, there is obviously a different discussion whether we're talking about entrepreneurial activities or direct investment with large companies and so on. In both cases there is some general things that apply everywhere that you need to have **strong research universities** you need to have **educated workforce** you need to have **property rights**, **efficient judicial system**, all these things that are table stakes in order to participate in the global economy and in the high-tech economy but particularly for satellites there is a revolution right now with this LEO satellites and I think that Greece as well as Europe they have to be able to participate and create **international standards** and create the **appropriate framework** so that the this new real estate is equitably distributed amongst all countries and is open based on open standards and based on open regulations and procedures that people can actually participate and different companies and in countries can be able to connect and provide their value to that network

- **Entrepreneurial** activity is as Professor Baras said, something that has to be taught and there is a lot of examples; Universities in california have entrepreneurial courses there's projects there is **incubators** and and other things that students get an exposure of what it is to take an **innovation** to market and what are other issues that are involved in that to better compete

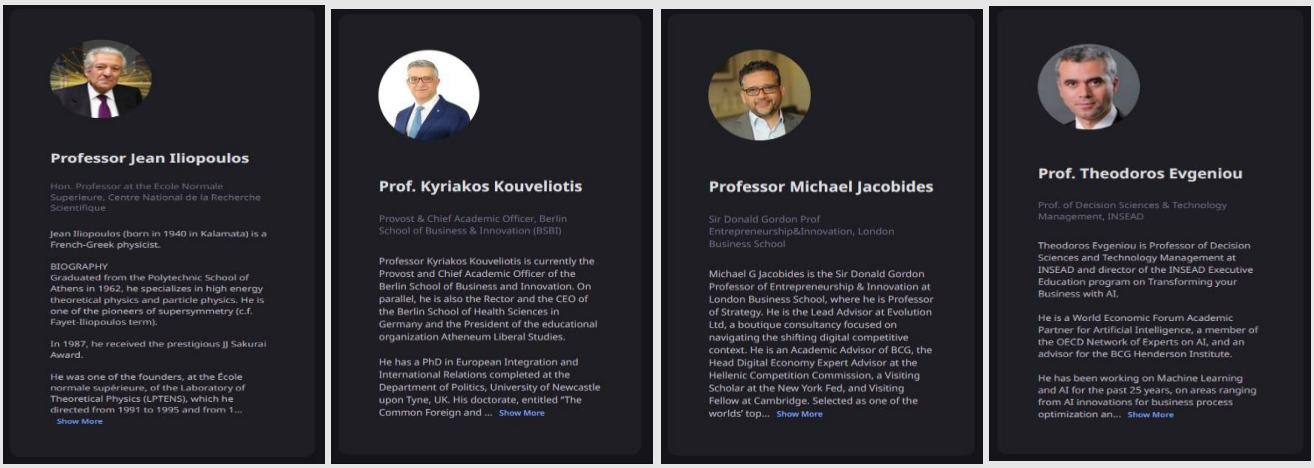
- The need for global collaboration in the satellite communication space Greece has to definitely be aligned with Europe, cannot do anything by itself but it can lead activities aligned with a general European effort, has to be **outward looking**, all the institutions have to be outward looking integrated in the European framework, but also the government could do more - **standards regulatory bodies**, things that can create a **framework** that innovation can happen and the technologies and the companies can flourish, in particular for these **low earth orbit satellite**s - and this new revolution Europe would not want to have a couple of American companies dominate the space and get most of the real estate in earth orbit space, like it's happened with previous revolutions in **internet** and **social media** and so on.

- This would need active engagement with international actors in in the form of **standards open standards, open regulations, and property rights in space**

- I would add in the use cases that Greece should be interested in and Professor Baras talked about Maritime, that could also be something that has to be positioned for these international bodies

Panel 3. Innovation in Technology: How can we setup and build momentum for a Tech Innovation Ecosystem in Greece and Cyprus?

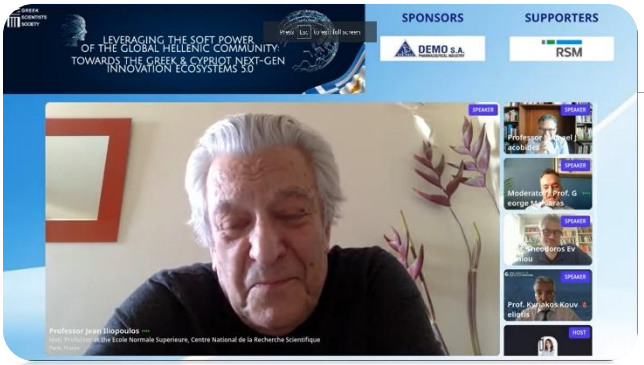
Speakers



Watch the video (click on image)



Moderator: Prof. George Malliaras



Key Takeaways

Prof. Jean Iliopoulos

- I have participated in many of those ESET (National Council for Research & Technology - Εθνικού Συμβουλίου Έρευνας και Τεχνολογίας) panels and Committees, we have written many reports and studies on how to use Innovation, Technology, Science to achieve economic development for Greece. One of them in a Committee chaired by **Professor Stamatis Krimigis**, we made a very detailed plan, still very good although need to update data, I'm ready to bet that this plan as well as many **others have not been read** by any other person except from us, end up their life in some cupboard in the Ministry or the General Secretariat of Research and Technology

- It is more or less obvious that a country like Greece cannot achieve economic development **without science and technology** and good **scientific means**. How can we use the fact that we have a **rather good educational system** and we produce **many good well-trained Scientists** to achieve economic development? The main difficulty is the implementation stage, **we know the remedy we don't know how to apply**

- I remind you of the famous saying, I think it's by Guillaume d' Orange, which in some free translation says “you don't have to hope to try neither to succeed to insist” so I will say that we may **not hope** but **we shall try** and we may **not succeed** but **we shall insist**

- For lessons learned from success stories in various foreign countries if they are applicable to Greece and how we transfer this know-how to Greece, a very important point because often we say look even say **Greek Scientists have made important progress in the Diaspora**, they have created important companies and the innovation but somehow these things **have not worked until now in Greece**, I don't have the answer this question exactly. I’m afraid that the lessons learned from very advanced technologically countries **may not be applicable** to Greece because **the social, economic, and political** conditions are totally different

- However, science and innovation by definition has **no borders**, it is the same innovation. What I often say is that the theorem by Pythagoras has no nationality, no religion it's just the theorem and it's valid for everybody, so it is the same thing with technology and we use the technology so what is the problem, what are the conditions that block the development in Greece in so that we achieve economic development for Greece, not for the Scientists themselves who can find their fortune everywhere but to achieve development for Greece. What should we do, maybe we **should look also at countries** which are **closer** to us as far as same population, social conditions, economic conditions things like that some of them have succeeded better than we have?

- We all know the stories of say Finland definitely, Israel, we have many stories like that but countries that were like Greece and have done better than maybe we should try to see **what they have done** and **what we have not done** so at the end of the story when we finish this panel, we must be able to say what should be done also to have some **follow-up** of this. I mean how are we going to continue this effort if the effort stops by just having a few people here a bunch of successful Scientists which have succeeded in business and thus telling us that it's wonderful to succeed in business but if we end here then we have not achieved that so we must be able to build some kind of dynamics that continues

- Countries that are comparable to Greece in size and economic resources and which have succeeded in obtaining development through innovation and can be used as examples for us I don't know the ones that are far away but when I was younger the examples that everybody was given was first, Finland - Finland was a poor agricultural other forest country that was mainly exporting wood to the soviet union to the foreign and when the soviet union collapsed they lost half of their market all of a sudden and then they had to do something and they did a very great effort in **education** and **research** and they really became an advanced country - the other example that people were given again my people of my generation was Israel - again a small country with no natural resources all these things and they succeeded in doing quite well in their innovation. I don't know how correct these examples are and how we can apply my simple-minded mind there is a **correlation** a very strong correlation between **economic growth, technological growth** better than technology and the **percentage of gross national product** that the country say puts down into research and development. Both these countries Finland and Israel today they spend **over three maybe three and a half to four percent** of their gross national product to Research. Greece a few years ago, when I had the data were 0.5 % and maybe now has been gone up 0.6, 0.7 but this is mostly because the national

product went down. I want to ask my fellow panellists here who know better these things than me is it is there a way, first of all is it correct that in order to bring economic development through scientific innovation we need to put **a little bit more money in R&D** and if this is correct how **can we convince the Greek society**, I don't think the government because all governments have done exactly the same thing, they all promise to do it and they never do so it's not the question of government it's the entire society how can we convince this society that this is the way if this is the way



Prof. Kyriakos Kouveliotis

- I have been working for the last 10 years in mainly two big projects, an initiative which has been recently published by the UN related to a **global degree** available in most of the UN countries and also a project which is to develop a **platform for the Hellenic diaspora**

- The idea was to bring all the Hellenic cultural and educational activities under a big consortium so to provide what I call the basis for the development of programs and activities related to the exact needs of the Hellenic diaspora in a variety of disciplines

- Since my area is **education**, **international relations** and **new technologies** focusing on **education**, I have designed how this can be introduced in Athens and in Nicosia and develop this kind of curricula using technologies starting from the old Web1, Web2 and even today Web3, encapsulating all related areas in education, culture information and media under one big platform

- With our in e-learning combining, what we call today **synchronous / asynchronous education**, after having the hard lesson of the covid 19 experience, technology helped us adding new features like **mobile compatibility**, even invite some prominent and eminent speakers from other Institutions, Universities from the whole of Hellenic Diaspora on **learning platforms**, we can have 24/7 access with no restrictions in time and geographical locations. We are designing **modern Greek language** learning for the age of groups from eight but even to mature, **ancient Greek**, courses on **tourism**, **hospitality**, and even on **shipping**, and **maritime**

- In a chair of Hellenic studies at the Open University (inaudible) in Rome we have created hundreds of **video lessons** of all the works of Aristotle on ancient Greek to Italian and English so that somebody can learn this for free and having access 24/7. There is literally no limit on this and when you have continuous interactive tutorial support, when you have video lessons with prestigious University Professors with what we call **virtual** and **blended learning** we have an amazing result

- At the second stage we develop the first Hellenic Web Educational TV portal, similarly to Italy and I'm now trying to do the same in Berlin in Germany, but imagine if the educational TV was not just for Greece but the whole world, it has a global perspective and covers the Hellenic Diaspora with courses also for Greek history and culture, religious and cultural events, live streaming, **professional networking**, even **virtual exhibitions**. **Web 3.0 technology** now gives us the opportunity to use **virtual learning** or having a **full digital environment.** If the international exhibition in Thessaloniki for instance, was open virtually throughout the year and we can actually visit all the exhibitors there and be in constant communication with them using why not, our avatars as Mr Zuckerberg announced in this **metaverse** project

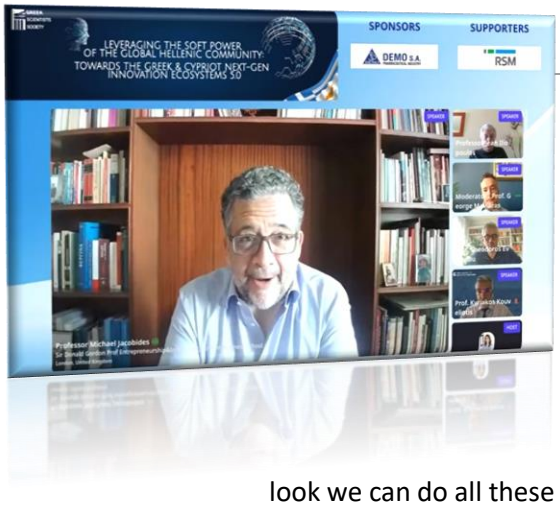
- Of course, a full **business plan** needs to incorporate all the potential assistance that the Greek Government can give us and also our **Diplomatic representations** abroad and of course all our Academics and other colleagues that are around the globe

- Technology especially in the last 10 years, has generated itself as a methodology domain so this is very crucial to comprehend for example, we can use web 3.0 tools for **virtual learning**, for **culture**, for **tourism** and so on. What we are lacking is to build a highway for this technology as now we have a lot of different small roads that they do not lead to the same destination. This is the key for me to try to unite all this effort under a **common platform** using the methodology that technology has generated itself as I mentioned and keep a very time framework on this and potentially initiatives like yours is what we need the most

- On what are the steps for knowledge and expertise transferred to the Hellenic domestic scene, we need first to organize what we can call a **global forum** that is a huge list of all the resources that are available around the globe as part of what we know as **Hellenic Diaspora**, namely Professors, Professionals, Entrepreneurs, Practitioners and so on, so this electronic database has to be active, interactive, diachronic and also online all the time so then there should be of course, various committees that will conduct some meetings that would lead to that would lead to **policy proposals** accompanied though with **action plans** that would provide a certain time frame for implementation

- Who never thought that Greece would have been **digitized** to this extent let's say two years ago and I think the key is to enhance the ties that we have around us even more and create this, we need to move from conferences and opinions and article writings to **policy actions** we need to **detach ourselves slightly from the glory of ancient Greece** and focus on the **enormous work that Greece and Greeks are contacting abroad** and how to create the **narrative** so to bring some of us at home

- Why most of the Greeks that move abroad really excel in their fields? the answer is not that simple like to blame Greek bureaucracy and lack of resources in the motherland. Also, for me the so-called brain drain has an enormous silver lining as well, and that is a k**nowledge expertise** but mainly the **attitude** that brings so we should encourage people to leave and experience abroad and if they will return to use their skills in the motherland. I think this is mainly **our new task now** and not theirs



Prof. Michael Jacobides

- I would agree with Professor Iliopoulos, accurate in its description predicament of part of Science which is, it is read by its authors not necessarily by a great many other people and I think that one of the things that we have seen in the changes in terms of science and its assessment is the shift between only its **production** to its **impact**

- We need to start shifting away from only the **production of knowledge** to the possibility of knowledge to move **a particular dial** and a friendly amendment to what Professor Kouveliotis was saying, look we can do all these great things to tamper with the realism of what will people **want**

- It is not just Science but also the **Economy** and even what we're saying in terms of our own panel, people start speaking about ecosystems, thinking about **Innovation Ecosystems** and **development ecosystems**, and that's what I study, ecosystems are everywhere now. Why is this the new buzzword? well there's a couple of reasons which I think are quite fundamental

and relevant to our meeting and it all has to do with the fact that we have **reached the limit** of what we can do in pushing **both knowledge** as well as in particular products and services along the existing delineations , the limitations in terms of the **division of labour**

- What we see in the growth of academic knowledge is that it starts cutting across the boundaries of existing trajectories that define the disciplines and the sub-disciplines and what we see in particular in the economy is that there is a great interest in seeing a development that is not in one area but in a **combination of different areas** that's why we're speaking about **ecosystems** because we understand that in order to find something in order to develop a new product in order to develop a new service we no longer rely **on one company** that focuses on an **individual** part **but in a set of interlocking things that come together**

- Now this is interesting not only for those of us who study the economy but it's interesting for the changing way in which Scientists connect to the world around them and the reason is the following; if you think about the world 20 years ago 30 years ago the idea is that **Scientists do their research** and then someone perhaps within a **large corporation** usually would see what **implication** it has it will be **translated** by others and then they'll enter the **production process** what we know in those of us who studied **Technology** is **the linear model** and we know that that is no longer descriptively accurate right now and what you have seen is to some extent, and that's the good news for this for the group of people listening to this event, a bit of the **revenge of the nerds,** so you see as we see this **abolition of the fixed boundaries** between the different products and services and the possibility of finding new knowledge bases that can be combined, you have a much closer association between **science and entrepreneurial development** that has come hand-in-hand with a revolution in terms of the **availability of funding** you have venture capital, private equity, angel investors and numbers who are willing to support it and they need to come together which is why I was speaking about ecosystems

- The emergence of ecosystems which itself is the result of the changes in the division of labour and society is **providing great opportunities** for the **productive use** and **embedding of scientific knowledge** in the production process and the good news is it doesn't need to be limited in Greece. What you have seen is that Greek entrepreneurial development has been much more **outward facing** because Greece is a very traditional and not very effectively regulated country, but this doesn't stop Greek Scientists from finding new ways of adding value

- On the division of innovative labour changing between academia and industry, the linear model which expects that theoretical research ultimately flows to industry applications if is still valid or not you heard very eloquently from Theos (Evgeniou) that it isn't and I would concur with a view that it isn't and there's a couple of different ways that I'd think about. The first thing is that the interest rate now is in topics that are **interdisciplinary** and this is where we absolutely urgently need the **development of technology and solutions** that cannot come only from **companies.** Now the capital markets are absolutely ready to **sponsor** things that have a very long horizon - what was the problem the past is that you said, well look if something is very radical in terms of the technology the potential payoff period is so long that it's never going to happen there so you will let it, it'll slowly incubate then someone who have massive scale will take care of it

- The good news is that as we see the economy is changing again, c**apital markets are very important** here because they are very **excited** to be part of a new **technologically driven growth and development**, perhaps sometimes even too much perhaps irrationally. They don't care necessarily to immediately make revenues now, this is good and it is good because it allows us to start being able to take technology and help it lead to particular solutions, and the second problem that undermines this idea of this you know well-structured linear model,

is that the problems that we're faced with and they are **survival problems** are problems whereby we need technology because we are confronted by new problems. If you think about the challenge of **the climate crisis** from which we may make this world inhabitable, this is something that Scientists have slowly started convincing not as well as they should, which also speaks to our ability and our need to start being much better communicators

- It is not important for us to be happy about having produced knowledge, it is important to be able to **communicate knowledge** so that it sinks in and that it changes the activities that we see around us, so we do have climate change to tackle the technologies that are emerging, create problems that business alone cannot properly evaluate, and an example of anything that includes (inaudible) which is connected with decision making which raises those issues that people have spent quite a bit of time thinking and where they can apply their training to start thinking in **applied ways**, this is not something that will happen in 15 years

- The question of just how far we can use the **wealth of information** that we have created in order to affect such issues such as allocating capital, are things that companies are asking pressingly today and this is not science being in some way that I have heard at times in Greece saying, oh we're selling off Science; it is the opposite it is the possibility of science to have an **impact** in society. The needs are there and what we need to think of is how can I take what I am doing to something that is going to have an impact now in terms of ways of doing it

- Another big change that we have seen is that another assumption that has all gone down is an assumption that relates to the **national boundary** in terms of the development both of knowledge and technological development given that in many ways we are creating now much more **global marketplaces** there is the possibility of knowledge and science that originates from Greece to have an impact beyond think

- What Professor Kouveliotis was speaking about all these new tools they do change and we do see that for whatever issues have emerged, as a result of the recent geopolitical crisis whether these relate to populist politics in the UK or the US whether these relates to Ukraine, you do see that there is a much more open both **knowledge development** and **business community** and that is where the Greek start-ups to a large extent have focused and you can see that in the impact the Greeks have and we know that Greek Society Scientists have got more impact than the average Scientist

- We're an ambitious lot, we're a hard-working lot and I think that what is missing more in Greece, than the Greeks that are abroad who have been socialized in slightly different ways not because they're any better not because they're any smarter but because they found themselves in a **different institutional context,** we see a greater attention to having this impact. The one thing that we need to do is to tell ourselves that impact and moving the needle and that being either working with organizations or with the government. By the way let me partly disagree with what Theos were saying, I work on competition and I can tell you one of the biggest problems we have is that **big tech** also **sponsors** most of the **research on competition** in the digital world I'm concerned with that. Scientists can do better, that takes courage. I think that there is a willingness to do that. The **death of the linear model** I think provides an **opportunity** when seen in conjunction with globalization but we just have to rise up to that and then ensure that the solution is not something that we expect to come from outside us so that the government funded x, y or z but this is something where it is also **our responsibility** of trying to rethink what our value add and potential and impact is in terms of society, overall

- When you speak with the people who are involved in entrepreneurship in Greece they're going to tell you that the problem is not the lack of money, I mean it's interesting we were in a round table in London with the Research Minister and the Deputy Minister for Economic

affairs and one of the investors came then and said we want tax subsidies, that's pretty much what Investors do and it's understandable - they want to enhance their returns - I wouldn't fault them but then the question emerges well is this what the botanic is and what you will see if you speak to the people who are involved in Greece that there is **more funding actually for entrepreneurial activities than there are good ideas**. It may even reach into the not terribly smart money issue that Theos were speaking about that in Greece has known to **corrupt generations of Academics** - if you tell people that the easy way to make additional funding is to make mindless reports and that these reports are going to allow them to build a house and they're going to do that - but the problem is that you want to first of all reduce some of that because it is counterproductive and the second is to imbue it with a bit of purpose and a bit more ambition by enabling them to have greater possibilities of connecting and sharing part of the upside of the value that they create

- Part of the issue is institutional and that has to do with what are the limits and constraints that we have in Scientists or in people who are involved in business in a more **entrepreneurial sense** to share part of the upside, there have been some changes in terms of the tax and legal environment to do that but this is important because Greece unfortunately, we spoke all these promises that are happening but Greece has got an employment structure, a tax structure that is very conservative in nature and we do have to change that and that is not easy we may say what can happen but you know we're not tax residents in Greece in order to have the full pleasure of seeing all the benefits of all the challenges that exist in the implementation but I would say that there are a number of companies in Greece that are proactively looking for people to work there

- There is something to be said in having careers that involve particular stints, there's a stint in which you can **leave the Academia in order to build something** because it may require a full-on attention, it isn't something that we should look down on unfortunately I don't think that this is quite the norm or would be quite easily accepted in Greece this is something that I think that we would need to encourage and support and **not see it as a selling out** but seeing as a how do **I turn ideas to have impact** and I think that we have the initial results of these that may start turning heads. I mean think about what happened now with the biggest buyout that has ever happened from entrepreneurial science in essence based venture that was Viva Wallet which was 450 people driven by someone who is relentlessly focused in terms of entrepreneurship and you have a company that was sold for well over a billion, I think that slowly a few entrepreneurial success stories that we start seeing may help because these stories have **greater flexibility in terms of the employment** than traditional established Greek firms which also are not terribly accommodating for the on average

- Again we have great examples of companies that are creating **hubs of Excellence** so I think that the answer there is be more **proactive** see what is moving in your field, feel free to start calling or emailing people if you think that you have a value proposition and I think that there is almost a well I'm going to put it greek "εσύ και ο γρύλος σου" nearly French, in the story that everyone understands what the story is but our own perceptions of the problems that exist may hinder us from seeking out and being proactive

- This the one thing that we can really change because it is a **self-imposed attitudinal limit** that **inhibits** you from seeing the **value** once you recatch what you're doing. I'm speaking about what we can start changing and also thinking about how you can connect not only within Greece but perhaps find any other connections for businesses that do something that in areas where you can add value it all starts with an awkward call and I think that you know getting out of the hesitancy to do it. I think will have more value added than any other admonition that someone from this panel can ever offer

Prof. Theodoros Evgeniou



- On the Academia-Industry-Government triangle issue, first of all I have huge respect for the Greek academic and scientific community in all my interactions.

- Let me start by sharing a little bit my personal biases because it's always critical to be upfront about our biases for two reasons; first of all they indicate our limitations and all of us have limitations and **unless we acknowledge them we will not progress** and second of all because actually through my biases specific ones I will outline, I will also make the same points regarding the question in different ways

- Bias no 1, is as you mentioned I grew up intellectually if you like in MIT that was back in the 90s where I went from my undergraduate straight after high school from Chalkidiki and then stayed there for my PhD for 10 years and that was also the year of the **dot.com** which was the wild west of tech and business innovation. Of course MIT like a couple of other top Universities in the US are probably the **golden standards** by far regarding how to **bring Research into business and vice versa**, so this is a big bias for me and I always believe that successful Academics come in different colours, for example some approve **deep theorems** and **deep theories** and get **Nobel prizes** and advance the **foundations** of science and technology, and others that actually make sure that the research they do is **leveraged** and **impacting** the world because at the end we are here to **impact** the world through making their **research leveraged through business** they built and that's exactly the model of family I grew up, and that's exactly is the model I always am biased to aspire to

- The second bias is that some of the best research I've seen and I try to do myself the same, is always between academia and industry the way I say it always and I always say this with my PhD and collaborators is that **reality brings up the best most interesting research questions** so once we look at reality to find research questions that are exciting. Therefore, we have to make sure that we are somewhere in between business industry reality and the ivory towers of Academia

- The third kind of bias I have is again I've been noticing at least through my lenses that some of the most exciting and impactful research and knowledge development has been always **multidisciplinary** especially today especially when it comes to discussing about not just technologies that create innovations business and economic innovations may impact related innovations but also **responsible technologies**

- We are at the stage where I think it is really historic. 20, 50 years from now we will look back and we will say there was technology and science, mostly technology I would say because science we went through this back in 100 years ago with people who got Nobel prize in physics and then got Nobel prize in peace, same here we'll look back and say there was **technologies before 2022 roughly** and **technologies after 2022 roughly** before moving fast and breaking things after ensuring we have responsible technologies that create **value** and **inclusion** of everybody and we are really historic moment

- This kind of approach of **responsible innovation technology** requires more than ever **multidisciplinary teams** working with **philosophers,** with **legal experts,** with **business people,** you name it this is critical to realize,

- These are my biases and I'm upfront about them and let me say the same points in a slightly different way to your question which I think I answered in some ways first it's a **continuous improvement process** it's not a transition from day one to day two we have to continuously improve our academic business and government triangle, we have continuously helped, we have continuously think about how to make sure that the **funding coming to academia is smart money**. I've seen, I'm sure all of us have seen a lot of sad, non-smart money coming into funding research that's terrible that has to cut, that does more damage than help, we have to continuously make sure that there are always **channels across industries government and academia** we've seen some of the top academics in the US schools nowadays having joined appointments with **big tech** we have the same internally to Greece and externally

- Second, we have to make sure that the **research is also the R of R&D** not just the R but the R of R&D always with a **feedback loop** between academia and reality because reality gives the best research questions and the research can impact reality which is what we are here for

- The third point as I said we need just to say in different ways we need to keep building **multidisciplinary skill sets** we need **new skill sets** we need academics to also understand a bit **business**, understand a bit communications with business, **entrepreneurship** skills understanding the **art of the possible technology;** yes we develop technology but what is possible with it and what are **the risks of new technologies** so we can actually make sure we bridge all those boundaries across academia, industry and government

- On the question why Stanford and MITs of this world are successful on spinning-off many start-ups while Europe including GR and CY is not, we have to understand that these questions have a **generational aspect**; I'll give an example we are raising funding for our for our startup now and we talked about to VCs (Venture Capital firns) in Europe and in the US. Let me give you one summary of my experience the past couple of months doing this. It is **day and night** because the VCs in the **US** are already **a couple of generations ahead** many of them being entrepreneurs 30 years ago while the business in Europe is still in generation one. We have to admit a generational gap which means that we have **a long-term view**, be **humble** continuously learn and most important what I always believe makes organizations great, is that every generation has to focus on **hiring people better** than themselves, if we don't do this we are doomed and it's very often this happens.

- Going to your question more specifically, first of all we need to have **role models** related to generational issues I mentioned we had to have role models and **celebrate** the role models, I had a bunch of role models in MIT myself, it's very hard to find them outside those top schools but they exist and we have to celebrate them, not make them hide from the from the face of the planet

- Second thing, is that we have to make sure and related to this the **culture is positive towards start-ups and innovation** and links between business and research, start-ups and research which relates to celebrate what we celebrate culture is not about what you celebrate; if you celebrate entrepreneurs academics that's what you will get

- Third of all is, I'm going back to **smart money** I think that's important and Michael (Jacobides) also mentioned something about funding, smart money. I'm not talking about money, money is easy especially today's like very easy, lots of it out there, that's not the problem. The problem is smart money and that's a **loaded term** I'm sure many of us understand exactly what it means there's a lot of non-smart money out there and that creates **more damage** than value we'll have to pay attention to this

- Fourth we have to have more **flexibility**; I mean I've seen, I'm still hearing horror stories, I hope they are changing fast, of Greek Academics who are having constraints about how much

they can work outside the Academia and how much they can get paid; this is terrible this has to end, why?

- Because, fifth we are here foremost not to report to our employer, not to report to our government, but let me say to report to what I can say "God", not in a religious term but in **our purpose** and what's our **purpose? impact**, **create impact** and if **flexibility** is required to do that let it be and by the way how about value and innovation? if you focus on what matters, my experience has always been, if we focus on what matters and we focus on impact, everything else from value to research output, to innovate to start-ups, to financial gains, will be just a very natural by-product; we don't have to plan for it, will just come

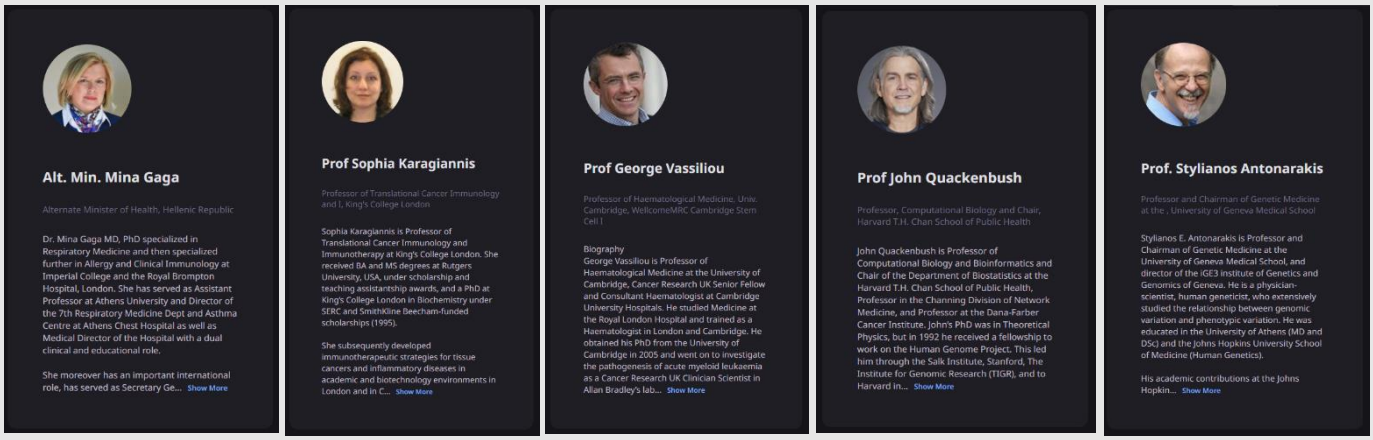
- On the skill sets needed to develop a successful Tech innovation in Greece and Cyprus, I will make a very fast comment related to this but also more broad and I'd like to suggest a specific action for us today which is the following; introduce **a new KPI** (*Key Performance Indicator*) in our way of thinking, personally when I see a background of somebody's CV or whatever I'm looking, **not only for the output** and the actual results but also for **how many people this person collaborated with,** the **number of co-authors** and especially the **number of quarters across organization, across universities and across Academia and business**.

- We should not just count papers, that's a dead end all times but to count **number of collaborators** from top places and across different areas, geographies and also academia industry that's the first action item

- I'm still very optimistic as long as I think we are all humble we have a long-term view and we are continuously improving and learning across geographies and across organizations, Academia and industry

Panel 4. Why Greeks are successful in the Life Sciences sector? How can we incorporate our distinctive talent to the dawn of the Greek Biopharma innovation?

Speakers



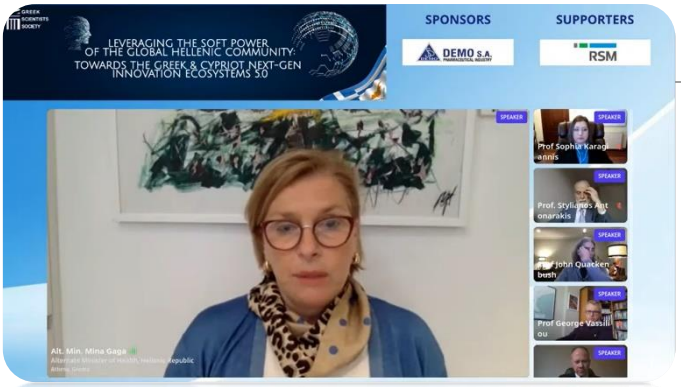
Watch the video (click on any image)







Moderator: Dr Panteli Theocharous



Key Takeaways

Alternate Minister Mina Gaga

- I'm a pulmonologist by training I graduated medical school and did my residency and PhD in Athens and then worked for two years at the National Heart and Lung Institute in London which is now part of Imperial College doing **clinical work** but also **research** in the field of allergy and clinical immunology
- To be honest the **work environment was so good** that hadn't I been married already, and my husband was in Athens, Ii wouldn't have gone back
- As a doctor I probably have better chance than a Scientist but still things in Greece are far more difficult for a Doctor or a Scientist than they are in the UK or they are in the States or in many other parts of the world

- Working here I was involved in the European Respiratory Medicine Society (ERS) and I've worked with people from all sorts of Academia around Europe but also the world so I've been to the States to Latin America, Australia

- What I can see and tell you is that things were much more paved in most of the European countries there's a lot more funding for Research there's a lot more organized background and facilities, big pharma is Switzerland, in the UK, in Germany but not in Greece although we are taking steps we have companies like DEMO who sponsoring today's event but also and other great companies who do research and innovation but also now we have hubs from international Pharmaceutical industry that can help but still the things in Greece are far more bureaucratic we lose a **lot of potential on clinical studies** and chances for a Scientist to work are fewer in Greece than they are in most of Europe, the European countries or in the States and nowadays even China has you know gone out with a lot of potential for a Greek a young Scientist

- Academia for example has a lot more funding in Europe than it has in Greece although things are changing and with the funds now, we hope to do better. I've worked with the European Respiratory Medicine Society and now I'm part of the Greek government as an Alternate Minister of Health and what I would like to do, you know Greece has also had the problem of 10 years of financial crisis and on top of that two years of the coronavirus, same as in every other countries, but this has **stopped innovation** this has stopped changes because you can't work with a system that is **really overcome by this coronavirus pandemic and crisis** so I think we have a lot of steps to take to make the country far more attractive for Scientists, young Scientists we do have a lot of bleeding towards many other countries - the UK although now with the Brexit things are a little better for Greeks, for Greece but worse for Greek Scientists - but many other European countries because **it's a free pass** to every other country

- We also now have a lot of **competition from Cyprus** especially for Doctors because the **salaries** are far **higher** and there's more **security work** security so there are a lot of steps we can take

- The things we're changing now in Greece, we still have a long way to go to be really attractive and to keep all our young talent in Greece, I do believe very firmly that people have to move around, they have to see how other countries and other cultures work, how other Universities work, it helps and **it's nice to have mobility** and move things, move people from other countries to Greece and from Greece to other countries, Cyprus among them

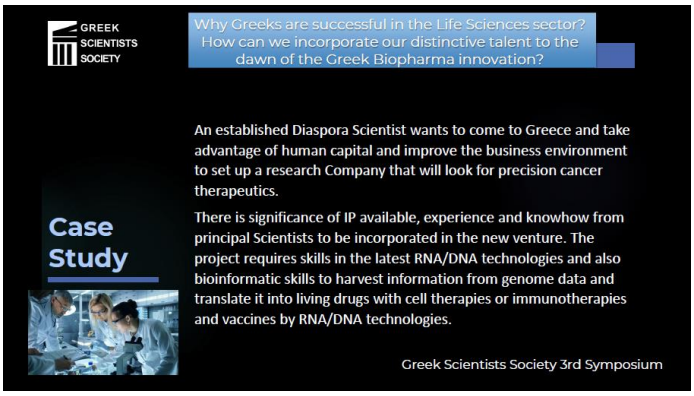
- We still have a long way to go to **make clinical studies** far easier to perform, we have a lot of potential we have a lot of patients, we have a lot of very good Doctors, and Centres but we're still very **bureaucratic.** There's a new plan for Universities to fund about **250 PhDs** with a budget of **36 million euros** which is not bad for the Greek state and this is starting now half of it is sponsored by the industry and this is a very good thing because I think in whatever we do we need to be together with the industry, the pharma industry, the technology industry, **digital information**, and Greeks are doing very well there, as they do in pharma actually and in my field in medicine, we also need to **incorporate the patients** as well because what we produce at the end of the day is what they need and what they will require

- I liked what John (Quackenbush) said but as a young Doctor training in the UK I was as I said in the National Heart and Lung Institute, at the time it wasn't part of Imperial College, as it

nowadays is but it was brand new and sort of state of the art we **had one cryostat** which we had to share between four departments then I went to Groningen in the Netherlands and there they have this huge beautiful University hospital, the editor of the new England journal of medicine was with us and he works at Harvard and he was in all of this hospital, I can tell you that the research lab within the hospital **had 20 cryostats** and that wasn't their routine work

- So, it's a totally different environment you talked about sort of Greeks in the diaspora we have a lot of great minds but here what you can have as you know a lab to working and funding to work with is quite a fraction of what you can have in the Netherlands or in many other countries, it's a difficult situation and yes you can have a lot of and I worked as until six months ago I worked as a clinician in the main lung Center in Greece so a big hospital that was also the referral Center for Covid and yes it was great that we could talk on a daily basis with Doctors and Scientists around the world we talked with the Chinese to begin with the Italians with the Germans we exchanged knowledge and this helped a lot but it **doesn't give you the means to do research** and it doesn't **give you the technology** to do research it also doesn't **give you the salaries** that people can have in other countries to stay here and work so there are a lot of and I guess Cyprus is a different standpoint but I mean it's things are quite different there as well it's a small country with less opportunity than a country like Belgium which is also a small country but it's at the Center of Europe with lots of people coming and going and the **ability to attract** people because of the EU because of the funding for research it's a totally different story so I think we need to take it a step at a time and think of what we can do how we can have the exchange of Scientists and medics and all that but also slowly at least create an environment where **people will want to live their lives** and bring out and sort of help their **careers** and their **output within the country**

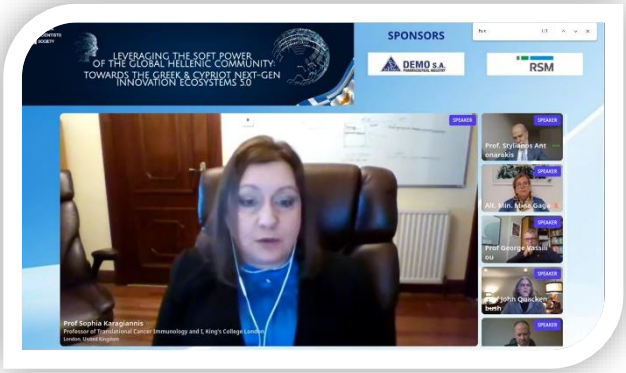
- I hope you can all have an input in sort of the things we want to do in Greece and the way we want to bring people in contact with you but also **build something here that will keep young people in research in innovation** and sort of help them strive and help them move abroad but also help them move back into the country



- Case Study

I think it's a great idea but I think to be able to do this and translate it into a medication or it takes an enormous number of people and technology so I think it's a big venture. We can start something small but it takes a very large facility and people to carry through from thought to actually having a drug and being able to carry out all the steps that needs people need to take even to the end of a clinical phase one trial rather than you know the whole and sort of designing a study and running it requires a lot of time and a lot of people but it's easier than actually taking it from scratch and taking from an idea and using the technology and the skills and the people that you need because it's not just one person I mean you have to have the expertise in the biology and molecular biology techniques but you also need to have the IT and so you need a critical number of people to start I would be happy to have that and support it but it's not a small project

Professor Sophia Karagiannis



- I am a Professor of translational cancer immunology and Immunotherapy at Kings College, I studied in Greece until the second the final year of secondary school and then I moved to the United States as part of my father's work and I finished high school in the United States, then I moved on to study for BA and MSc at Rutgers University and then where I received various **scholarships** and **teaching assistantships** to complete my studies. I saw an opportunity studying there at Rutgers where I really focused very much on biochemistry and basic science I was learned by **translational science** - it didn't exist as a term at the time - but I really wanted to work on something **that was applicable to patients** and could have **the potential to help patients** and **improve health** and I moved to King's College London to conduct a PhD with Professor Hannah Gould, who is international authority on IgE and allergy, and was one of the first people to establish the role of IgE in allergy, in fact. There I received a science and engineering British Council scholarships and also sponsored by SmithKline Beecham which became GSK later to conduct my PhD on IgE and visceral immunology and how that relates to developing drugs to improve asthma and allergy for patient care and I spent significant amount of my time at GSK doing **research on site** which gave me an **excellent insight on how research can be really linked between academic research and pharmaceutical research**

- I then moved on to work in another pharmaceutical company which was a spin out from GSK in Cambridge where we looked at immunotherapeutic strategies for cancer and my passion for cancer immunotherapy started around those around that time and then later on I moved on to receive an NIHR (National Institute for Health Research) **fellowship** in 2007 and then I was completely sold on staying in Academia to conduct reasons that really was relevant to patients which was very much the theme of that fellowship and that fellowship scheme I had received

- My lab is very much interested to understand how **B cells**, the antibody factories in our body **work in the context of cancer**, and to use that information to **unleash the potential of therapeutic antibodies** which are now really dominating the **cancer immunotherapy** field and really making a difference for patients and we apply this information to actually develop antibodies within my lab and **actually one of our drugs** has made it from concept to the **clinic opening the field for a brand new class of antibodies that can be given to patients we completed a phase one clinical trial** for this antibody and in the meantime while I was doing this I also founded the company in 2017 which was called IgEm therapeutics which then was named later **Epsilogen** limited

- This is the **first immune oncology company** to make IgE class antibody therapeutics for cancer therapy.

- Alongside all of this I decided to stay in the **academic side** and still link with my company and **support their academic innovation** and very proud to that my company has completed series A funding they received government funding as well and more recently they have been able to secure a **series B funding of the over £30 million** in the meantime

- I've opened the field together with other colleagues what we call elect oncology which is the link between allergy to immunity and cancer and try to understand how this can teach **both allergy and cancer fields to improve treatment for patients**

- My interest in this panel is as you can I think it's really obvious I have a huge interest in seeing **exciting innovation** for both Academia and pharmaceutical about technology to be linked together this model has applied in abroad for many years and I believe it is possible that these models can apply also in Greece

- I am very privileged to have received **excellent education in Greece** but also seeing the educational systems abroad in two continents in the United States but also in Europe I live in in the United Kingdom and I teach in within my university I have a very big teaching commitment, and really very happy to see **how wonderful talent comes from Greece** and I really believe that all of us who **moved abroad have a lot to give back to our countries** and we want to give back to our country and we been very grateful for the **fantastic training** we have received and wanted to really see innovation and success in Greece take off

- I think this is an opportune moment in Greek history and European history where we can really come together and make things happen a lot of **models have been seen abroad** and have worked and we think we can apply some of these models and a lot of this work can be taken on by academics and entrepreneurs within the ecosystem abroad and **develop an ecosystem within Greece** and I really believe that this is what's missing what's missing the borders to be broken down the international concept of science having no borders I think this is where we can consider the next steps for helping Greece and Cyprus flourish

- I believe that I speak for many people that well all of us want to **act as Ambassadors** we have been acting as ambassadors of our country abroad in one way and we believe that we can **offer something back to support Greek innovation and Greek science** and I think both basic science, translational science, biotechnology pharmaceutics innovation can really come together to make this happen

- I agree with all of the points I hear and professional Antonarakis point is excellent and Professor Vassiliou I really want to kind of bring that together from my perspective in that I do follow what goes on in Greece and I see some **pockets of excellence** which are really fantastic and really in awe of what these people can accomplish within the environment that they are in and the opportunities they are given but what I think we might want to do is **less about funding and more about bringing people together** and making conversations **instead of pockets of excellence to make centres of excellence** and this is the foundation by which **innovation and entrepreneurship** can really thrive in Greece and I think there are practical things we can do for example we can **organize programs** and they're not that difficult to do exchange programs so that **international exchange program students** can come from abroad to Greece and vice versa they can **bring skills back** to Greece and part of the **scholarship** is to return to Greece to their original base to exercise some of this knowledge that they have acquired second perhaps some **more summer schools** and **symposia** that are focused on

important elements of Greek research that can really help Greek Scientists in Greece and also potentially we have we're doing it abroad already we bring in **visiting professors** for a certain period of time to **teach students to inspire young people** in other universities in different countries and this this can actually happen relatively readily and will offer opportunities to really inspire young people and to really **engage Greek Scientists in Greece with Scientists abroad**

- Many of the success stories I see in Greece are people who have **tapped in into this international community** and they're really engaging with the community and bring the outcomes in Greece and I guess I would agree with our previous speakers as well that we have (inaudible) here in Greece we **have big data artificial intelligence computational biology** these things can be really the foundation of this which are less difficult for example than having to really keep **out very expensive lab**s and bring in very **special skills** in that way there's a lot of talent in Greece that we can take advantage of and I think it's a starting point we also have a very well **informed very strong medical community academic clinicians** who can really help here as well with clinical research and then moving towards the trials as well I think these are two areas we can really expand and really work on to develop the foundations for what can be an amazing ecosystem we have really already the talent in place and I think it's time that we bring it together. I can tell you from being abroad Greece is having a moment right now abroad people are really looking to Greece for many things and I think it's time that we all step up to **do our beat for back for our country**

Case Study

I think these are difficult ventures and I agree with Ms Gaga this is really a very difficult project in any country let alone Greece, but I think there's two points from my perspective, first you **can't have** really fantastic **biotech** and **pharma industry** without having **the basic and research science in place and the communit**y because I think that interaction is how pharmaceutical and biotechnology industries thrive with that baseline

So that to me is a very important element to support so that is a starting point, but also bringing in **skill from abroad** and interacting with **Scientists around the world** can also provide a lot of that support and baseline and an infrastructure or foundation if you like that could support those ventures just like the case study that you just described Dr Theocharous

This is kind of my perspective and in the old times even abroad at this transversion between basic and translational science into pharma and by technology was impossible but now we have fantastic **models abroad** that people are doing that we have a lot of back and forth **in between academic environments and by technology environments** not only in collaborations but also people **moving** from one industry to another and being successful in these either **dual roles or hybrid roles** or changing the roles and bringing these experience across in both sides

To summarize I think **supporting basic academic and translational science** is one way by which the **baseline** and the **foundations** can be developed and reaching now to **collaborate internationally** I think can **bridge a lot of the gaps** that we might have in Greece



Professor George Vassiliou

- I studied Medicine in London, I did my primary and secondary school in Limassol in Cyprus, I finished my national service and came here to study medicine, thinking in a very narrow way I was going to train, become some sort of Doctor expert in some specialty and return to Cyprus to **offer my services to the Cypriot public** and things turned out differently and after I finished my medical school at the Royal London Hospital in London I was fortunate enough to enter a training program to become a **Haematologist** as part of that again, fortune more than skill, got me to do a PhD at the University of Cambridge to study the pathogenesis of blood cancers leukaemia and from then on I have followed the primarily Academic career, although I have continued throughout and I still do now to practice haematology and I have patients that I look after with leukaemia and related cancers

- I see this fortune this opportunity as something that you know just happened to me and I felt that I have to **give something back** I have throughout my time in the UK tried to **give back to Cyprus** and in 2008 together with a close friend and colleague Pavlos Kosteas we got the large European infrastructure grant to help us set up the Center for the study of haematological malignancies which is based within the Karaiskakion Foundation which is a Cypriot bone marrow registry, I would say in passing that Cyprus has by far the most registered bone marrow donors of any country, 20% of Cypriots are registered donors the next country is about two percent. We've taken that opportunity we've set something up in **Cyprus**, I am now Chairman of the Board of Directors of the centre of study and President of the Karaiskakio Foundation Scientific Advisory Board (SAB) I've continued to help set up research diagnosis we do this the Center does free diagnosis for all Cypriots, Turkish and Greeks, so any patient even from a private doctor will get free diagnostic tests so they're not burdened at a time of need

- More recently I was involved in a big initiative between the university that you can see in my slide there the University of Cyprus the cypress oncology Center and the cardiology foundation itself to set up a cancer research institute in Cyprus funded by a big charitable donation from the David Pineda family, the building is close to finishing, it will finish this year. I have already formed the first group that's part of this institute we are recruiting **more Scientists and the director for the institute** and we hope that we will set up **a world leading institute in Cyprus** certainly my lab in Cambridge which includes both wet lab Scientists, Doctors, Bioinformaticians he's already formed the bridge and he will be coming over to Cambridge to train and to return back with expertise and my big aspiration is and this is perhaps most pertinent what do we discuss next is to set up a PhD program where people can come and get a PhD from the University of Cambridge with the expectation that they will return at least for a length of time back to Cyprus what they do of course after that is up to them but at the very least they will be landing back in Cyprus for a period of time in the hope that they will develop their infrastructure and the atmosphere for these things to happen

- The biggest difficulty I see in transferring expertise in biomedical research and translational research to Cyprus and to Greece to a certain extent is to create an environment where this research can thrive. In here sitting here in Cambridge if I have an idea if I have a small discovery there is people around me with expertise in all the fields I want to tap in to that help me catalyse that discovery very recently for example we managed to develop a new type of driver against leukaemia I would not have stood the chance to do **it in many places outside Cambridge** so I believe the expertise, the talent, the will is all there in Cyprus and in Greece and we just have to take responsibility as we're doing as that these Greek fortunate great people of the Diaspora to try and set things up back in our countries

- I want to come back to the fact that the way I believe we could go forward is to leverage people in positions of being able to **catalyse training programs**, **scientific exchanges** in Europe and some extent the US even. what I've just said earlier that it is possible to do things at a distance to try and create ways of back and forth for Greek and Cypriot Scientists to centres of excellence, so that they can **harness expertise** they can **learn they can bring things back** they can find the steps in the ladder **from innovation to translation** so overall optimistic

- I would like to see these Cyprus cancer researches you to do something like that by way of like proof of principle and you know I'd be very happy to interact with anyone who wants to take part with this Institute because it is cancer but cancer research relies on basic biology so any way in which people think they can contribute or modify the model or contribute to this model of exchange and help from a distance

Case Study

I have something a similar perspective to Sophia but also another slightly different angle as well so I have experienced set-ups, now increasingly, where international teams are trying to build companies or trying to carry out collaborative research. I mean a lot of the models of the European union are playing in this way, unfortunately Brexit is a big donor on every effort that certainly from where sitting here in the UK but I don't think that's insurmountable so I think the one positive we're taking from the one big positive I can see from the covid 19 pandemic is the fact that we've all learned **to work remotely and interact efficiently** without being in the same room or in the same building

I do think that is where if I were in a position where I could make things happen that's where I would look you know there is a lot of good Greek Scientists that they have a natural affinity understanding with other great Scientists and we **can help set up** this **particular case study** for example could harness that **potential from abroad**, you know if I was invited to contribute for example some input to such a company, is fairly easy I mean I contribute to companies in different countries as an Advisor for example when asked to so I think that this is where we have an opportunity

I think to catalyse something newsomething new but now obviously something that works well to try and help innovate try and provide what John called very nicely an ecosystem so the ecosystem again **doesn't have to be a physical ecosystem in one place** we can provide the **intellectual ecosystem** to try and make such **a venture happen** so that's where I would put my effort at this stage

Professor John Quackenbush



- My PhD was in Theoretical Physics under the guidance of Greek gentleman Terry Tomboulis at UCLA and after working for a few years in Physics the Human Genome Project was getting underway and so I applied for and received a fellowship to work on the genome project that took me through the Salk Institute for Biological Studies in the US then to Stanford university to the Institute for Genomic Research and eventually to my current position at Harvard

- I work in what we would refer to **as computational and systems biology** and what I think of in this context, is that every single experiment, every single enterprise that we get involved with in research really has as its primary output, data and the main question we have to ask ourselves in doing science, is if we design an **intelligent experiment** how do we take those **data** and **make sense of them,** how do we understand **the drivers of disease** and so I've been doing that for quite some time and would love to talk in great detail about what I do

- One of the things we've learned is that you have to be very thoughtful about how you **collect and manage data** and so in 2012 some colleagues and I spun out a company really built around collecting these increasingly large data sets and making them accessible for people and one of the lessons that taught me is that if you're going to try to build an enterprise it's really **important to have things that people need not** just things that **are nice to have** so we always characterize what we what we try to do is **building need to have technologies** rather than nice to have technologies

- if I think more globally about the Greek students and postdoctoral fellows and colleagues and collaborators that I've had over the years those that **have returned to Greece have typically gone back** because they have strong ties and Institutions that can provide support for them so, Maria Klapa was a Postdoctoral fellow with me and she's now a Professor leading a metabolomics unit in in Greece (FORTH/ICE-HT)

- I have other colleagues who've gone back to work at the Hellenic Pasteur Institute and it's really having a career path forward that they can see as being essential for bringing them back the others who haven't gone back, haven't seen that and if I think about this in context, I think there are a few things we think about the University positions which we have to have but there **are far fewer of those than the number of Scientists that we can train**

- Thinking about this you know what you really need to have
    - is a pharmaceutical industry that can absorb some well-trained people and give them opportunities
    - you need a biotech biopharma community that can absorb those
    - and to build those you need a strong investment community, so there are lots of things that are in place in Greece and in Cyprus that could support this but I think we have to think more broadly than just biology, biotech
- We have to think about **the larger ecosystem** that would support this **kind of work**

- If we think about data and data science, I think this is actually a place that I'll speak to the Aalternate Minister as well, that investment here goes hand in hand with an **investment in biotechnology** because really the greatest advances we're going to see in the next five to ten years in the health sciences are going to **be driven by data and access to data** and really **intelligent ways to collect manage, analyse and more importantly interpret those data**

- As we think about investments what we have to do is think not just about investing in the technology but also **formulating robust questions** that we can try to address using those technologies and so for me a big part of thinking about building this kind of ecosystem really starts with identifying those questions that we'd like to address

- In the context of developing **a national strategy** or you know a Greek strategy spanning Greece and Cyprus the place to try to really brainstorm **is where there are unique resources that you can take advantage of** and to **address specific questions** and being part of the larger European ecosystem really where you can leverage resources and funding and other opportunities that exist within Europe so I think there's a real opportunity to do important things if we start by **asking what are the problems we're trying to solve and then build on** that but at the end of the day you know I constantly come back to this simple idea that the **best way to try to keep Scientists in Greece or to bring them back to Greece** is to focus on those **opportunities that are given them the chance to take their discoveries** and have a **significant impact** and to be able to take their **knowledge and understanding and do things** that they feel are going to be **transformative**



Professor Stylianos Antonarakis

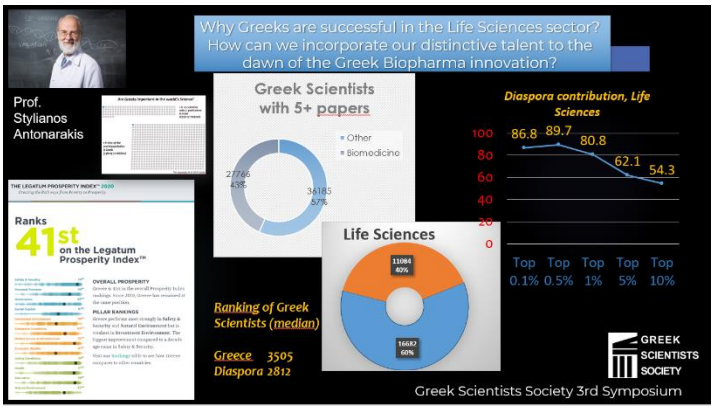
- I am a medical geneticist or somebody who practices the research and practice of genetic medicine, my scientific home now is the University of Geneva, a Professor of genetic medicine. I was graduated from the University of Athens in 1975 and then I did paediatrics for a while and then I asked the question for a **young physician who wants to contribute to medicin**e, and excuse me **for my youth dreams, to change the world** what I should do. There was a big unknown at the time the big unknown was **the genome** so I said that's me I work on this and so I went to the Johns Hopkins University in Baltimore where was one of the centres of genetics at the time and stayed there for about 15 years, became a full Professor with tenure and then we decided to move back to Europe, for one simple reason, that the coffee is better in Europe, and we landed in in the middle of Europe, University of Geneva because I saw the opportunity to **develop my own school**

- My main interest is the impact of the knowledge of the genome in health and disease and the economy and my research is the **linking of the genomic variability with the phenotypic variability** with different **phenotypes, disorders and traits**

- I was for administrative jobs I was the President of the European side of Human Genetics for a while and the president of **HUGO** (Human Genome Organization) which is an international organization for the genome research and the main goal of this organization is and was the

genomic equity throughout the world and we basically worked with the countries outside of Europe and North America and I participated in many research projects

- if you ask me in my career what was the **most important item for the development and the success,** I would say **hire colleagues that are better than you** because if you hire colleagues that are less good than you then you may control them but they **don't innovate** and they don't they **don't advance the science** well if you, so actually **excellence** is most important in my view than infrastructure



- I like the numbers and I like to focus on the human capital a little bit of what we're talking about as Greek and Cypriot Scientists and for this I take the opportunity to show you a few slides

- to understand what we're talking about Greece, our country has a ranking as of last year from this prosperity index 40, 41 in the world and you see the discrepancy among different sectors and you see that in health that's about 37 and so in general the health sector in Greece is a bit better than the general position of the country in the world

- Although the health sector is quite healthy the research sector including the health research is quite poor so here is a map of Europe that was published in nature about two years ago and the density in the map of Europe is represents the impact factor per investigator in different European countries and you see of course that the Center of Europe, Paris, the Netherlands, the west part of Germany and Switzerland, and also the UK and you can see a little bit of Italy, and a little bit of Spain but you see very little of Greece

- In Greece in terms of input for per investigator if you compare this to other European science is quite sub-optimal. On the other hand, the world has more Greek Scientists than you expect given the size of Greece in the top panel you see one in 125 Scientists with five or more publications in the last 30 years is Greek - 63 951 out of seven or almost eight million investigators. On the other hand, one in 600 of the of the world population is Greek 13 million out of 7.5 8 billion so there are many Greek Scientists in the world more than expected by our population, all these data are from a fantastic study of John Ioannidis, a Professor in Stanford and I give you the reference if you're interested.

- From all the Scientists, Greek Scientists about 43% as you see in the left panel working in life sciences and I focus on life sciences now and from these life sciences Greek names in the world 60 are in Greece and 40 are elsewhere in the world, so the majority of the of the life sciences investigator in mass is within mainland Greeks Greece 60 to 40. In spite of this, when you rank the input of Greek Scientists as the median of inputs, the Scientists in Greece are in position 3505 and in the reeks in diaspora they have a median that's better than this statistically much better than this 2812. So in general the output of the Greeks in the diaspora is higher than the Greeks in Greece

- If you take the point one percent of the top of the Scientists that contribute the best of the best the one in a thousand Scientists in the world that contribute and you take the Greeks in that category 86.8 percent are in the diaspora and the rest as in are in mainland Greece. The same

thing is with the top 0.5 percent 89.7 percent of top-ranking Greek Scientists are in the diaspora and the balance of this are in Greece

- If you go down the top one percent top three percent top ten percent let's, go to the top ten percent in the top ten percent the Greeks in the diaspora are equal to the Greeks in Greece so that means that for okay science the Scientists that are in Greece that perform equally to the Scientists outside in Greece but for the super good science most of the people are in the diaspora
- There is disproportionate high number of Greek Scientists in diaspora, Scientists with high impacts tend to be in the diaspora rather than in Greece. Greece is rather underperforming in European science output and the average impact Scientist is equally found in the diaspora in Greece
- In other words to increase the science output in Greece one needs to import extremely for the world **the best of the best and not the majority** of and not and **not at random** of any Scientist, in other words one needs **to be targeted** to the **high impact Scientists** to bring them back to Greece with whatever that requires and these people could **be role models** not only role models but **producers** and **doers** in mainland Greece like I could give you the example of the Prime Minister Eleftherios Venizelos, long time ago that went to Germany to see the great mathematician **Karatheodori** himself and he said come back to Greece, I will do whatever I can to help you and he succeeded to this
- The remedies to consider, of course the Minister knows that very well improved riches funding, continues funding, competitive funding, and not opportunistic this year and then three years later and five years later, improve the infrastructure but mainly in my humble view is **to invest in people**
- I would like to add the one thing that although our country has many islands but Greece is not an island and it's not isolated from the from the rest of Europe and I would like to think as a Greek, it contributes to European science so in other words we're not competing with our European friends and cohabitants of this continent but we're working together. However, we need to excel ourselves to **be leaders in some areas** not on everything but focus on some areas in which in which we become the centre of Europe and I hope the **next generation will have a couple of Nobel prizes,** too

Case Study

My experience with the industry is not that extensive, I founded a diagnostic company Medigenome at the Swiss institute of genomic medicine and the success of this company in Geneva is **based on the quality of its people**

I also know a company (Saphetor) that's very dear to me in Lausanne a company of bioinformatics, computational biology the goal of which is to identify important variants in the exome and the genome and although the company is based in Lausanne, the most of the Scientists and programmers are in Greece and so the company as we said before does not have a headquarters in the Greek Center however most of the human power and the production and the interpretation of the genomic variants is done by Scientists who are sitting in the Greek territory



A few words about Greek Scientists Society

Greek Scientists Society is a Global Network of Greek & Cypriot Scientists (the largest on LinkedIn)

Click to join us here

We believe that Science and Technology are the fundamental drivers that bring Humanity social and economic improvement leading to knowledge-based communities and networks that prosper in the international landscape. We build the Greek Scientists Society (GSS) in a way to connect all Greeks – in Greece, Cyprus, and abroad – promoting our e-ecosystem and support a thriving start-up Community.

We wish to

§ Promote discovery through scientific research
§ Train Scientists for the future
§ Build international networks for the participation of GR and CY in global science
§ Promote Scientists ' entrepreneurship

Our Mission is

- to Build Knowledge and Capacities, through scientific research and the training of young investigators in other disciplines and concepts like Entrepreneurship, IP Law, AI, etc
- to build a Global Network of Greeks through innovative programs of collaboration between Greek and Greek-descent Scientists and entrepreneurs
- to build Value, by developing technologies and products that serve the needs of society
- to cultivate and promote the Hellenic ecosystem to in the international environment.

We wish to bridge and become the catalyst, joining forces between our Diaspora – GR and CY soft powers - and leverage the best qualities of each part to

- Transfer knowledge
- Facilitate Scientific Ventures
- Develop Scientific Collaborations and Synergies



SYMPOSIUM
By the Numbers

Who attended our Symposium

18 Speakers & 4 Moderators

5550 Attendees on LinkedIn



300 Invitees on Airmeet platform

~ 550 YouTube views (so far)
~ 3200 views on LinkedIn post (so far)

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