



HELLENIC REPUBLIC
National and Kapodistrian
University of Athens

*In memory of
Nikos Antoniou*

1939-2020

Nikolaos Davis, Fotis Diakonos,
and his colleagues

March 18 2021

60 years of contribution to Science



Graduate of National Technical University of Athens (1962)

PhD in Mathematical Physics, University of Birmingham (1967)

Docent in Theoretical Physics, University of Athens (1970)

Research Positions in:

- ▶ the University of Oxford (1967)
- ▶ the ICTP in Trieste (1968)
- ▶ the University of Tübingen (1969)
- ▶ the Technion, Haifa (1973)
- ▶ the National Center for Scientific Research “*Demokritos*” (1970,1972-75)
- ▶ CERN (1971-72,1973-75,1989-90,1998-99)
- ▶ the University of Cyprus (2009-2012,2015-2016)
- ▶ the University of Santiago de Compostela (2009)



60 years of contribution to Science



Faculty member of the Physics Department of the University of Athens (1975-2006)

Professor Emeritus (2006-2020)

Administrative Positions:

Member of the Board of Directors in the
Hellenic Atomic Energy Commission (1974-77)

President of the **Hellenic Physical Society (1981-83)**

Chairman of the **Greek National Advisory Committee
for CERN (1982-86)**

Scientific Director of the **National Center for Scientific
Research "Demokritos" (1982-89)**

Scientific delegate of Greece to the **CERN Council (1982-89)**



A pioneer of the strong interactions phase diagram



From fractals to criticality: a life-long pursuit

Nikos Antoniou very early realized the **importance** and **rich potential** of the **phase diagram** of **strongly interacting matter**, even before it became the focus of theorists' attention in **Lattice QCD** and **effective models**;

Following the introduction of the **intermittency technique** in **multiparticle production** by **A. Białas**, he was among the pioneers who **foresaw** its **power** of detecting **scaling patterns** as a signature for **collective phenomena** connected to **critical behaviour** in **strongly interacting matter**; and was one of the first to introduce **fractal geometry** and **complexity** concepts as **analysis tools** in Theoretical Particle Physics;

His pioneering work, from the 90s onwards, **launched** the **intermittency-based** search for the **Critical Point** of **strongly interacting matter** in **Ultra-relativistic heavy ion collisions**, which continues to this day.

From theoretical vision to experimental practice



Role in NA49 & 61/SHINE “Light Ion Program”

A key insight of Nikos Antoniou was to look for fluctuations of observables playing the role of **critical phase transition order parameter** in hot and dense matter; achieving the **appropriate vacuum excitation** was crucial;

His revolutionary idea was that even relatively **small nuclei** could produce a **critical fireball**; **common belief** held that only **very large nuclei** collisions could produce **criticality**;

Nikos proposed to look for **intermittency of pion pairs** near the two-pion threshold, as well as **protons**. This motivated **NA49** to conduct the corresponding data analysis, in which Nikos and his collaborators participated actively and developed experimental and phenomenological techniques for.



*The QCD Phase diagram Conference
Skopelos, Greece, June 2004*

From theoretical vision to experimental practice

Role in NA49 & 61/SHINE “Light Ion Program”



A great success of this scientific effort was the **observation of critical fluctuations in Si+Si collisions** at 158A GeV at the **NA49** experiment in SPS, CERN. This unexpected finding initiated the “**Light Ion Program**”, a scan in **collision energy** and **nuclear mass number** of colliding nuclei realized by the **latest generation** colliding ion experiment **NA61/SHINE** at CERN, SPS.



*The QCD Phase diagram Conference
Skopelos, Greece, June 2004*

Bridging theory and experiment



Although primarily a theorist, Nikos Antoniou **actively reached across** the aisle towards **experimentalists**. He and his collaborators have participated in **NA61/SHINE** since its inception, and played a **leading role** in the **intermittency analysis** of collected data. In this arduous process, Nikos Antoniou was **always eager** to grapple with **experimental challenges**, and often contributed **novel solutions**;

Nikos co-chaired the local organizing committee of “The Critical Point and Onset of Deconfinement” workshop (CPOD2018) in Corfu, and was the **primary driving force** behind its **successful realization**. He became a member of the **CPOD International Advisory Committee** shortly afterwards.

The CPOD2018 Conference, Corfu, Greece, Sept. 2018



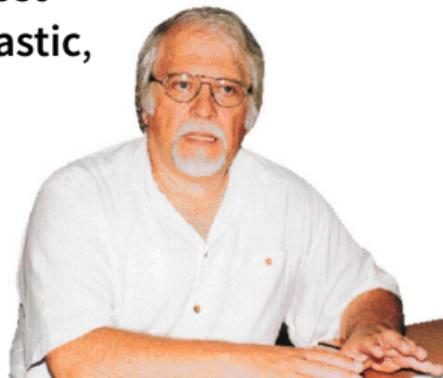
An inspiring teacher



It is a rare occurrence for an **avid researcher** to also be a **skilled teacher**, and yet such was **Nikos Antoniou**. Many **young students**, myself included, have had the **pleasure** of attending his **lectures**. He taught with a **clarity of mind** and an **almost contagious enthusiasm** for his subject; and he was equally **enthusiastic**, while being **strict and precise**, when working with his colleagues.

There is no better testament to his **impact** as an **educator** than the **legacy of his students**; **7** out of **10** of the **Ph.D students** he supervised during the **3 decades** of his **active tenure** in the **University of Athens** went on to have **fruitful academic careers**.

Having had the **honor and privilege** of receiving his attention as a student and a young scientist, I can personally attest: what little I have accomplished would **never have been possible** without his **encouragement, guidance and enthusiasm**.



An irreplaceable void



As a person, Nikos Antoniou was enthusiastic and he was able to transfer this enthusiasm to his friends, colleagues and collaborators. He was very substantial and simple, while being precise at the same time. Tireless in his work, his presence was felt and his contributions were valuable to the very end.

He was always defending strongly the scientific ethics in research and he consistently resisted all attempts of commercialization and subordination of science.

The best and most lasting memorial to **Nikos Antoniou** is for us, his friends, colleagues and students, to continue his life's work, the search for the Critical Point of strongly interacting matter, to expand the horizons of scientific knowledge.



Passing away Nikos Antoniou left an irreplaceable void. We will always remember him as an inspiring teacher, an invaluable collaborator and most importantly for his free scientific mind.

