

## Special Article of Prof. Nicolini 75<sup>th</sup> Birthday, Editor-in-Chief NanoWorld Journal

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**Received:** March 31, 2017

**Accepted:** January 12, 2018

**Published:** January 13, 2018

**Citation:** Belmont A, Eldarov M, Pechkova E, Riekel C, Sette F. 2018. Special Article of Prof. Nicolini 75<sup>th</sup> Birthday, Editor-in-Chief NanoWorld Journal. *NanoWorld J* 4(1): 1-7.

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Published by United Scientific Group

### Andrew Belmont

I was a MD, Ph.D. student with Dr. Nicolini during the late 1970s and early 1980s at Temple University.

As a newly admitted medical student, I still remember engaging in small talk with a former lab member turned dental student, Elliot Milgram, while anxiously awaiting my interview with Dr. Nicolini for a summer research position in the laboratory. My anxiety only grew as I heard what suspiciously sounded like loud shouting from behind the closed doors of Dr. Nicolini's office, all the way on the opposite side of the laboratory. Elliott saw the concern on my face, and said, "Don't worry. That's just Dr. Nicolini and his best friend, Frank Kendall, having a scientific discussion". Judging the look on my face, Elliott decided to give me some parting advice: "Look, all you need to do well in this laboratory is to be ready to stand your ground. If Dr. Nicolini raises his voice, you just raise your voice back louder with all of the reasons why you think you are right".

Jumping forward several years, late one afternoon I found myself having exactly one of those scientific discussions with Dr. Nicolini. Suddenly he sat down abruptly onto a lab chair, announced that he thought he might be having a heart attack, and asked me to get him a glass of water. Gathering his thoughts while sipping the water, several minutes later Dr. Nicolini announced his decision. "I'll tell you what. First, do the experiments the way I suggest. Then, if you still want to, you can repeat the experiment your way".

As I remember, I did the experiments his way, was quite happy with the results, and never did do it the way I had originally proposed. Looking back nearly 40 years later from the perspective of a long career in academia, I realize how rare Dr. Nicolini was as a mentor. To have a research advisor so passionate about his research and yet so open to critique and alternative ideas, even from his most junior colleagues, is quite rare. I count myself fortunate for the training I received, and still try to imitate that same excitement and openness to alternative ideas as much as possible, although not so successfully, with my own students today.

*Andrew Belmont*  
Professor, Department of Cell and Developmental Biology  
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## Michael Eldarov (Note-1)

I met Professor Claudio Ando Nicolini (CLAN) first time in summer 1991 in the office of our chief Professor Skryabin in the Institute of Molecular Biology, Moscow. CLAN came to recruit Russian scientists to work in his lab in Genova in the framework of collaborative Russian-Italian initiative in bioelectronics. At that period of “brain drain” many Russian scientists started moving abroad, and I also had a signed contract to work in NIH to take part in Human Genome Project (HGP). After a short conversation with CLAN I was so impressed by the exiting perspectives of bioelectronics, biosensors and thin films, the opportunity to work in the international Russian-Italian team and to visit lovely Genova, and by the temperament and erudition of interlocutor, that was at the edge of dropping the NIH contract. I explained where in US I plan to stay and for what reason. CLAN replied that to his mind that place is rather dull and added something unflattering about the enormous cost and poor efficiency of HGP. Embarrassed I wandered off to US. Soon I realized the correctness of at least some of those statements. Several years after that already in Genova I again was in position of choosing between bioelectronics and genomics. I had to interrupt my stay to go for a month to one lab in UK. CLAN let me go with an advice “not to spread too thin” and added something unflattering about climate in northern England. Embarrassed I wandered off to UK. The weather was awful indeed, but I was lucky to have a chance to use my stay to continue the research on recombinant cytochromes thanks to kind permission of lab chief, that was rather useful for further collaboration with CLAN.

These two episodes (and many others!) show, to my mind, the exceptional ability of CLAN to reshape by just several sentences the research focus of his partners and colleagues to most ambitious goals. Over the borders and years, here in Moscow we still feel this influence and still try to find proper balance between molecular genetics and bioelectronics.

*Doctor Michael Eldarov, FRC Biotechnology RAS.*

## Michael Eldarov (Note-2)

Warm evening in June 2016. We sit at the table on the veranda of an ancient Italian house in the town of Pradalunga in the foothills of the Alps and listen carefully to the speech of our host, Professor Claudio Nicolini. Around the table there is a small group of Moscow students and their teachers-participants of the joint educational project between Moscow State University and the University of Genoa. Lectures and seminars are over, and we, hungry after meetings, consume with appetite the octopus salad, washing it down with a glass of homemade wine. Professor discusses the values of civilization and freedom, comparing changes in the public consciousness since the time when his ancestors, local landowners, hunted in the surrounding hills. However, we do not feel completely free and at ease, as we are subdued by the temper and intelligence of the charismatic and hospitable host of this house and the amazing atmosphere of this mansion turned by the efforts of its inhabitants into a small elegant museum of engineering and

art. The furniture of the medieval Italian house, remarkable paintings of ancient and modern artists, adjoins here with exhibits of scientific equipment of the late 20th century, which served not so long ago by faith and truth to large international group of researchers who worked productively at the various laboratories created by Nicolini initiative. At the basement near the first models of atomic-force microscopes, instruments for thin film manufacturing and analysis, I notice posters with the programs of autumn schools on biophysics, regularly held in the 90s in Bressanone. I see my name among the speakers of one of the schools and vividly recall the events of almost 20 years ago, a car trip along the picturesque mountain road from Venice to this charming town in the north of Italy. We gathered to discuss a concrete plan of joint research efforts in the framework on the INCO-COPERNICUS project, one of the important directions of Italian-Russian cooperation in the field of bioelectronics and nanotechnologies, which was developing intensively in the mid-90s and early 2000s. In the framework of this joint EU grant, it was possible to unite leading experts in the field of cytochrome P450 biochemistry from Russia, Belarus, Italy and Germany, and its implementation became a major step forward in the study and practical application of these important proteins. Recalling various episodes, twists and turns of the previous cooperation, we clearly realize that then and now this partnership was not as simple.. Nicolini is a demanding organizer and coordinator, who always set an extremely high bar for efficiency and quality of work, challenging seemingly insurmountable technical and other obstacles. Nevertheless, how rewarding were the results, reflected in numerous articles, books, presentations at various top-level scientific meetings! The interdisciplinary approach, the profound knowledge in various fields of physics, biology, technology, etc., the ability to overcome scientific, social, organizational barriers, intuition, experimental skill, the ability to entice others with his enthusiasm are just some of the features of the proprietary scientific style of Professor Claudio Nicolini, that had earned him worldwide fame and gathered around him a huge group of collaborators and friends. Now, crowned with deserved awards and titles, he continues his active scientific and organizational efforts. Let's wish him on the threshold of just his next quarter century period strength and enthusiasm, new achievements for the benefit of science, education and social progress.

*Doctor Michael Eldarov, FRC Biotechnology RAS.*



Figure 1: (A) Among the participant of XLI Nanoforum, 23 June 2016, Pradalunga (B) Explaining the applications of historic nanotech instruments (C) Posters with the programs of the former Italian Autumn Schools on Biophysics, Bressanone. (D) XLI Nanoforum closing party. Forty octopuses were sacrificed for the sake of science and education - eyes for rhodopsin extraction, tentacles - to feed the participants.

## Eugenia Pechkova

Prof. Claudio Nicolini was my PhD supervisor at Genova University. I remember that he was quite demanding with numerous PhD students he has. At the same time, he was trying to set for everybody personal research project, often completely different from others, and frequently asked for the results and novelty, interacting directly with the students, even with those of the first year, and not relying on other senior scientist and professors of the institute he was heading. He insisted that everybody has his own research and did not like group works. In the beginning, for the just graduated students, it was very difficult to imagine do to something by yourself only, but with time this approach has helped a lot to acquire the self-confidence, creativeness and independence, not only in science.

I remember that his lectures were very different from the other professor's ones and were aimed not just to teach some discipline or technique, but mostly to have an understanding of their scientific potential and impact to entire humanity. After lectures, discussion or meeting with him, the most important feeling was motivation to go further in study and scientific research, which I now consider the most important

in this profession, and the most important thing the professor can ever give to the students. Other important issue was that he always gave full credit to every new student or collaborator, and it was from one hand very encouraging, but from the other hand required much more responsibility and many efforts to not disappoint him and confirm his faith in this person.

In conclusion, I consider myself very fortunate to be Prof. Nicolini student, and I am very happy to hear when sometimes other people find my teaching behavior or scientific way of thinking similar to ones of my supervisor's.

*Prof. Eugenia Pechkova*  
*Head of Laboratories of Biophysics and Nanotechnology*  
*University of Genova Medical School, Italy*

## Christian Riekkel

Claudio Nicolini has had a long and mutually fruitful history of interaction with the European Synchrotron (ESRF). I remember in particular my first encounter with a somewhat frustrated Claudio trying to perform protein micro diffraction experiment at the ID13 beamline. Things quickly straightened themselves out and Claudio, together with Eugenia, have become regular users of ID13 and ESRF

protein crystallography beamlines. Their pioneering work on radiation resistance of LB protein crystals is a legacy to the protein crystallography community. I have also had the privilege of encountering Claudio as a “brasseur d'idées” in science at many meetings and I am fortunate to call him a personal friend.

My best wishes for your birthday. Keep up the spirit!

*Christian Riekell*  
Experiments Division  
Complex Systems and Biomedical Sciences Group

## Francesco Sette

The ESRF is very grateful to Professor Nicolini for his long-term engagement with the ESRF. He has not only conducted excellent science on ID13 with C. Riekell and colleagues from other beamlines, but also, during the last 20 years, he has been supporting the ESRF programme at world level. He is still using the ESRF in his nano-science endeavors and we hope to continue to see him often in our laboratory.

Happy birthday Claudio from all of us at the ESRF.

*Francesco Sette*  
Director General

## Biography of NanoWorld Journal Editor-in-Chief Claudio Ando Nicolini

Academician and Professor born in Udine (Italy) April 4, 1942, from 1968 to 1971 Research Associate of Nuclear Physics at Massachusetts Institute Technology in Boston and at Brookhaven National Lab. Associate Professor of Pathology in Temple University Medical School from 1972 to 1975 became USA Citizens in 1976 when January 1 tenured Full Professor of Biophysics and Physiology and Chairman of Biophysics at Temple University Health.

Science Center until October 31, 1984 when happily returned to Italy to occupy the tenured University Chair as Eminent Scientist until October 31, 2012. Life President and founder of Fondazione EL.B.A. Nicolini in the center of Rome from 1993 to October 31, 2012 and from November 1, 2012 until now in Largo Redaelli 7 at Pradalunga in Bergamo ([www.fondazioneelba-nicolini.org](http://www.fondazioneelba-nicolini.org)). From 1978 until now Director of the International School of Pure and Applied Biostruture and winner of up to 10 NATO Advanced Study Institutes in Erice at the Ettore Majorana International Center of Scientific Culture (Figure 2) and 1 NATO Advanced Study Institute in Elba Island at Polo Nazionale Bioelettronica in 1994. He maintained a constant link mainly with USA, Europe and Russia, but also with Japan and with multinational companies, reaching in 1983 a peak in his worldwide recognition when he was asked to chair the Symposium at the Crossing of Life and Physical Sciences (with 17 Nobel Prize winners) on the 150<sup>th</sup> Anniversary of Alfred.

NOBEL's birth held in the Sanremo Nobel Villa (Figures 3 and 4) upon the presence of the King of Sweden and the President of Italian Republic Pertini. Indeed in 1984 was called as Eminent Scientist to the Chair of Biophysics at

the University of Geneva Medical School for Chiara Fama (Figure 5) and was named Science and Technology Advisor to the Italian Prime Minister.



Figure 2: Claudio Nicolini at the Ettore Majorana Center in Erice.



Figure 3: Nicolini and Nobel Cherenkov in Sanremo.



Figure 4: Nicolini and Nobel Baltimore on a newspaper

Craxi in Rome from 1984 to 1987. Having his private residence in Geneva and from 2013 until now also in Padova Via J. Crescini 147c, President of Industrial (CIREF, Technobiochip) and International (Biochip Project between USSR and Italy, NanoWorld Journal and NanoWorld High Tech LLC in USA from 2017) Research organizations; member international academies (Russian Academy Sciences



Figure 5: Nicolini at Geneva Medical School.

in Figure 6) and Professor at Universities (Stanford, Geneva, Paris and Temple University, Lomonosov Moscow State University in Figure 7); from 1990 until 2003 President of Polo Nazionale Bioelettronica- Scientific and Technological Park of Elba. The multinational industries represented a strong support on all his initiatives, namely: CIREF composed by the biggest multinational companies controlled by Italians which appointed him to the Scientific Direction coordinating research activities at Agrate (ST Microelectronics), Milano (Montedison), Novara (Gruppo Ferruzzi), Saluggia (Sorin Biomedica), Ivrea (Olivetti), Fiat (Orbassano) and Geneva (Elsag-Bailey and Ansaldo) towards new hardware, new software, new drugs by recombinant engineering and



Figure 6: Russia Science Minister Kirpichnikov and Member Presidium Russian Academy Sciences



Figure 7: Nicolini and Moscow University Rector Saadonic.

structural proteomics, new organic nanotechnology, new instrumentation (AFM and LB) and new sensors for health and environment. This received the strong support of the Italian government with an 8-years long multibillions Bioelectronic Research program. At the same time the Italian government was providing big support for science and technology in the key area of biotechnology and nanotechnology. From 1983 to 1987 Nicolini acted as advisor for Science and Technology to the Prime Minister Craxi (Figure 8).



Figure 8: Prime Minister Craxi and Finance Minister Formica with Claudio Nicolini.

TECHNOBIOCHIP s.r.l founded by Claudio Nicolini as described by the Economist in September 1995, while POLO NAZIONALE BIOELETTRONICA was constituted in 1990. At the beginning of its research activities, the PNB concentrated in the public domain starting numerous international collaborations with institutions and research organizations from USSR, United States, Europe and Japan. Later the PNB decided to take directly in its hands also the industrial research and the technology transfer issues of the overall bioelectronics, submitting a proposal for a Scientific and Technological Park at the Elba Island that was selected

in 1994 by the Italian Government in open competition with other 42 similar proposals. Many new members entered the PNB, among them SGS Thomson Microelectronics s.r.l., Finmeccanica S.p.a. (namely Eltag Bailey and Alenia Spazio), Sorin Biomedica and Eurochem. It is worthy of note the participation of small companies such as AsseZ, Microtech, High Vacuum Process, and of public scientific institutes (Area Ricerca Trieste and Istituto Trentino Cultura-IRST). Other companies, such as Eltag Bailey Hartmann & Braun have been joining the PNB to underline its international vocation in many industrial research projects developed in the R&D Laboratories set up. The PST Division was consolidated in Elba Island on October 1996 and organized in six Centers. This gave birth to a very successful Science and Technology Park of the Elba Island in both fundamental and industrial area, recognized worldwide as can be seen below in figure 9 from The Economist in 1995.

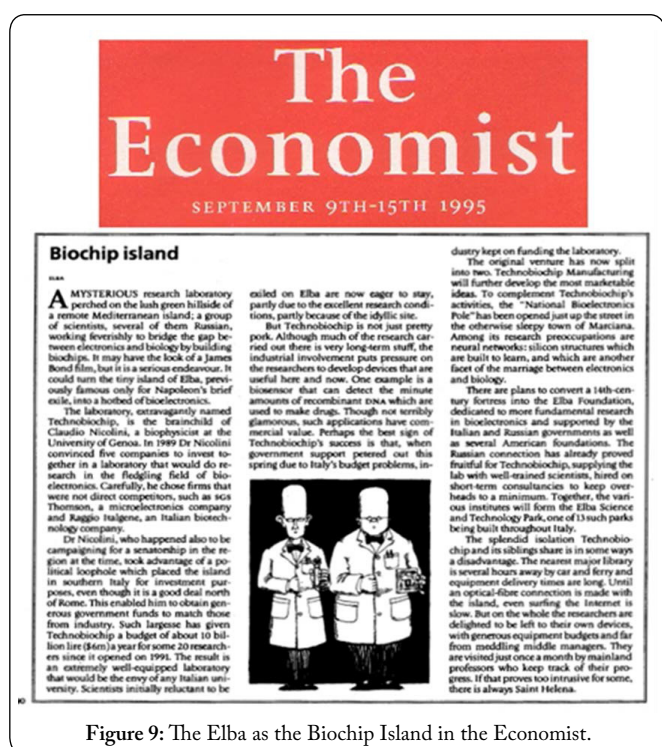


Figure 9: The Elba as the Biochip Island in the Economist.

## Claudio Nicolini Key Recognitions

**1979-1992:** Editor-in-Chief Cell Biophysics and International Journal MIT

**1983:** Chairman Symposium Nobel Foundation on "Biosciences at the Physical Science Frontier" with 17 Nobel Prizes in presence of the King of Sweden and President Italian Republic Pertini

**1983:** Chairman of the "Science for Peace Forum" with Zichichi with the participation of 47 Nobel Prizes in presence of Pope Giovanni II in Vatican.

**1983-1987:** Science and Technology Advisor to Prime Minister Craxi

**1984-1987:** Member of the Science and Technology Committee of the Prime Minister Office with Nobel Prizes Dulbecco and Segre

**1984-2012:** Chair of Biophysics at the Medical School University of Geneva "ChiaraFama"

**1987-2009:** Scientific Director of C.I.R.E.F., an Industrial Consortium STM, Enichem-Donegani, Sorin-Fiat, FICE-Farmitalia, Eltag-Bailey, ABB, SNIA, Hamamatsu e Montedison.

**1988-1997:** President of the Government Programme on Bioelectronics

**1994-1997:** Vice-President of the Government Programme on Advanced Biotechnology

**1989-1993:** Chairman of EL.B.A. Project Italy, USSR &CEE

**1989-1994:** President Technobiochip, Marciana Livorno, Italy

**1990-2003:** President Polo Nazionale Bioelettronica and President Scientific and Technological Park of Elba Island

**1990-1998:** Member of National Science and Technology Council named by the Italian Parliament

**1997-2003:** Co-Chairman PNR Biotechnology 2 and PNR on Microelectronics Bioelectronics

**1996-2003:** Chairman DISTBIMO University of Geneva

**2004-2010:** Director of CIRSDNNOB University Geneva 2010-2012 Visiting Research Professor, Curie University at Paris

**2010-Now:** Lomonosov HC Biophysics Professor Moscow State University, Russia

**2015-Now:** Editor in Chief NanoWorld Journal, Santa Clara California and Plato, Texas USA & President NanoWorld Conference Boston & San Francisco, USA

**2017-Now:** President & CEO NanoWorld High Tech LLC, Tempe USA

His strong links to multinational industries worldwide is evident with the creation of new organisms carrying out industrial research and having Academician Claudio Nicolini at the top (Consorzio Industriale Ricerca e Formazione, Technobiochip and Polo Nazionale Bioelettronica, all having as consortium members large multinational FIAT, ABB, Montedison, ENI, STM Microelectronics, USSR/Italy Biochip project) which has opened a cooperation with European Synchrotron Radiation Facility from 2002 to now (Figure 10), Japan (Figure 11) and USA (Figure 12). This is synthesized below in his overall carrier progression mainly in USA, Europe and Russia, but partly also in Japan (Table 1).

All the above activities in Russian Federation, USA, Europe and Japan finally converged into the new present final organizations. As the NanoWorld Institute in Bergamo



Figure 10: Christian Riekel at ESRF.



Figure 12: Peshkova at Arizona State University in 2017-2018 and at Fondazione ELBA Nicolini.



Figure 11: Nicolini with Nobel Prize winner Rich at a scientific meeting in Kyoto (Japan) invited by sir Koji Omi at STS Forum October 4-5 2015.

Europe and the NanoWorld High Tech LLC in Tempe USA, whereby the overall numerous patents developed and owned by the Fondazione Elba Nicolini in Bergamo in Bergamo ([www.fondazioneelba-nicolini.org](http://www.fondazioneelba-nicolini.org)) in close connections with Nicolini University Chair in Geneva ([www.ibf.unige.it](http://www.ibf.unige.it)) are now directly linked towards industrial development via the NanoWorld High Tech LLC and not indirectly as already done successfully via the numerous multinational company earlier indicated. At the end of 2017 Nicolini biography has been selected into 2017 Albert Nelson Marquis Lifetime Achievement Award Winners, which is comprised of the top 3% of the professionals in the world, honoring individuals who have demonstrated leadership, excellence and longevity within their respective industries and professions.

Table 1: Nicolini Career Progression worldwide

1961	1974	1984	1994	2004	2014	2017
1961						Italy+USA
	1974					USA, UnivMajoranaNato
		1984				Europe, UnivGovInbb
			1988			Russia, BiochipRasMsu
				1990		Japan+India, CirTbPnb
					1993	Europe, FenNwiFp
					2014	USA, NWJ, NWC, NWHTLLC