



Biography of Carlos Nelson Elias

Carlos Nelson Elias, PhD, is a Full Professor of Materials Science and Engineering at the Military Institute of Engineering (IME), Rio de Janeiro, Brazil, where he holds the Chairs of Physical Metallurgy and Biomaterials. With more than four decades of academic leadership and technological innovation, Professor Elias is internationally recognized for his pioneering contributions to biomaterials, dental and biomedical devices, advanced metallic systems, and high-performance ceramics.

Professor Elias began his academic career as a metallurgical engineer, earning his doctorate at IME, with research focused on high-strength niobium-microalloyed steels. His solid foundation in physical and mechanical metallurgy later expanded into biomaterials, where he successfully bridged fundamental materials science with clinical applications in dentistry and medicine.

Throughout his career, he has played a decisive role in advancing the science and engineering of dental implants and prosthetic systems. His research on nanocrystalline commercially pure titanium demonstrated mechanical performance comparable to that of the Ti-6Al-4V alloy, enabling safer, high-strength alternatives for biomedical applications. This technology has successfully transferred to both civilian and military sectors.

Professor Elias also pioneered innovative surface engineering strategies for dental implants, accelerating osseointegration and improving long-term clinical performance. One of his patented technologies (INPI PI0602093-3) was transferred to industry, strengthening Brazil's domestic capability in advanced biomedical manufacturing.

In ceramic biomaterials, he led the development of high-performance zirconia blocks for CAD-CAM dental prostheses. Originally conceived as an academic initiative, the project evolved into a commercially implemented product in Brazil, contributing significantly to the modernization of restorative dentistry. More recently, he has expanded his research into additive manufacturing of high-density zirconia for advanced biomedical applications.

Professor Elias has supervised 35 PhD and 57 MSc theses and has mentored numerous postdoctoral researchers. He has authored four books, 90 book chapters, and delivered over 320 presentations at national and international conferences. His scientific impact is reflected in more than 13,000 citations (Google Scholar), with an H-index of 55, placing him among the Stanford/Elsevier Top 2% Scientists Worldwide (2021, 2023, 2024). His citations and metrics are: Scopus: 6,175 citations and H-index 37; Web of Science: 4,887 citations and H-index 34. He is a CNPq 1A Researcher - the highest distinction awarded by Brazil's National Research Council—and a five-time recipient of the FAPERJ "Scientist of Our State" Award.

In addition to his research accomplishments, Professor Elias has demonstrated strong international leadership and collaboration. He has organized scientific symposia in Brazil and at the TMS Annual Meeting (USA) and has maintained research collaborations with leading institutions worldwide. His work consistently integrates academia, industry, and clinical practice, contributing to technological innovation and sustainable development in dental and biomedical devices.

In recognition of his outstanding contributions to materials science and biomaterials, Professor Carlos Nelson Elias is honored with the Elias International Symposium on Dental and Biomedical Devices, to be held during the Sustainability through Science and Technology Summit (SIPS 2026). His career exemplifies the transformative impact of materials engineering on healthcare technologies and sustainable industrial advancement.