

December 20, 2021

Professor Paolo Atzeni
Università Roma Tre
Dipartimento di Ingegneria
Sezione di Informatica e Automazione
Via della Vasca Navale 79
00146 Roma, Italy

Subject: Letter of support for granting Professor Emeritus status to Alberto Paoluzzi

Dear Professor Paolo Atzeni,

It is an honor for me to write this letter of support for granting Professor Emeritus status to Professor Alberto Paoluzzi, who is a leading researcher and a true pioneer of Solid Modeling.

In fact, he was awarded the official status of Solid Modeling Pioneer by the Solid Modeling Association in 2017, see <http://solidmodeling.org/awards/sma-pioneers/sma-pioneers-2017/>, which honors early contributors who have been influential in starting and expanding the field of Solid Modeling or its applications in Academia or Industry.

The field focuses on the mathematical and computational models of solid shapes, of their morphology and topology, of their properties and behaviors, and of their aggregations into complex structures, such as those found in new micro-materials, in mechanical assemblies, or in large architectural projects. Solid Modeling provides a plethora of results and tools that impacts other Research fields, such as Robotics, Manufacturing, Architecture, Surgery Planning, Animation, and Computer Graphics.

At the heart of Solid Modeling lies the question: “How should one represent a solid” so that the representation be compact and suitable to support the efficient computation of precise answers to a variety of queries on the represented solid. The queries range from the basic “Is a given point inside the solid?” to complex queries, such as “what is the difference between two solids and where it is most significant?”.

Over more than four decades, two leading approaches for representing solids have emerged: the Constructive Solid Geometry (set theoretical regularized Boolean combination of primitive solids) and the more popular Boundary Representation

(connectivity graph of the bounding faces). Research on the underlying mathematics, on numerical precision, on the use for physical simulation, on algorithmic principles for reducing the processing cost, and on hardware-enabled acceleration spans thousands of papers in top tier conferences and journals.

It is quite remarkable that, on top of this vast international effort, Professor Alberto Paoluzzi, with his students and collaborators, has invented an attractive new variant that combines these two approaches in a surprisingly elegant way so that the representation of the connectivity and geometry and the most fundamental queries on these may be implemented using efficient tools of binary linear algebra. In addition to publishing the deep theoretical foundations and justification of this approach, Professor Alberto Paoluzzi has recently produced a GPU-based (i.e., hardware-accelerated) library for next generation of solid modeling system.

Amazing!

There is absolutely no doubt in my mind that his visibility, his international stature, and these contributions qualify him for the status of Professor Emeritus.

Sincerely,



Jarek Rossignac, Professor
School of Interactive Computing
Georgia Institute of Technology