



May 26, 2023

To: *Visiting Student Research Collaborators Program*

Re: *Letter of Recommendation for Mr. Mateus Bastos Neiva*

I am pleased to write this letter of recommendation for Mr. Mateus B. Neiva, who is being considered for a sandwich doctorate program at Princeton University under the supervision of Professor Glaucio H. Paulino.

I have known Mateus for over five years since he joined the Mechanical Engineering Graduate Program of the Pontifical Catholic University of Rio de Janeiro (PUC-Rio). He consistently demonstrated to be an outstanding student. His research experience and solid engineering and computational science background can lead to significant scientific breakthroughs.

I was the advisor of his Master's Thesis entitled "*3D Numerical Elastoplastic Analysis of Stress and Strain Distributions Around Crack Tips*," where its main objective was to obtain numerical results of the elastoplastic stress and strain fields associated with the crack tip when subjected to cyclic loading. His work used analytical solutions for variable cyclic loadings, elastic and elastoplastic. A comprehensive evaluation of the hypotheses employed in the analytical formulations was also considered. He was also one of my best students in the Structural Optimization course.

In 2021, Mateus started his Ph.D. at PUC-Rio, under my supervision. The possibility for Mateus to develop part of his Ph.D. research work in a high-level environment such as that offered by Prof. Paulino at one of the world's most famous and renowned universities, such as Princeton, will be a unique experience with a significant scientific impact on his work and academic training. Professor Paulino has relevant contributions in the area of computational fracture mechanics, such as, for example, the PPR method, which is widespread in the technical literature.

The proposed work to be developed in collaboration with Prof. Glaucio Paulino's research group presents great scientific relevance in offering a parameterized solution for the problem of stress and strain fields close to the crack tip. This area shows a lack of knowledge. A non-singular solution is highly relevant for future work on damage calculation, a growing research field in fracture mechanics.

Thus, he has my highest recommendation for his application to the scholarship for a sandwich doctorate program at Princeton University.

Sincerely,

Ivan F. M. Menezes – Associate Professor
Department of Mechanical Engineering (PUC-Rio)
Rio de Janeiro, Brazil