



UNIVERSITY OF
ARKANSAS

Office of the Provost and Vice Chancellor for Academic Affairs

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Dear Alberto,

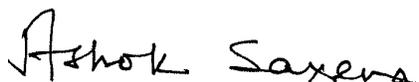
I am absolutely delighted to know that you are nominating Prof. Paul C. Paris for the Wohler Fatigue Medal and I feel honored to have this opportunity to write this letter of support. I first heard about Paul Paris in 1970 because his name was mentioned several times by my professor in a graduate class in fracture mechanics. He was already internationally renowned at a very young age. At the time this field was considered to be an evolving, cutting-edge research field and Paul Paris was regarded as a pioneer. Five decades later, the history has clearly established that Prof. Paul Paris' contributions to fracture mechanics approach to fatigue are not only numerous but are regarded as ones that have had the most impact. As a researcher in the field, an author of a text book on the subject, a past recipient of the Wohler Medal, and a teacher of graduate classes in fracture mechanics, I have become even more appreciative of Prof. Paris' contributions. In my opinion, his overall impact on the field is comparable to that of the late George Irwin who is fondly referred to as the father of modern fracture mechanics.

As you well know, the field of fracture mechanics is about predicting the behavior of structural components during service. It is used extensively in design of these components, in studying the behavior of new high performance structural materials for such applications, and in developing field inspection strategies as part of good maintenance to avoid catastrophic failures. By a conservative estimate, fracture accounts for over *125 billion dollars in losses annually*. Hence, understanding of fracture is of vital importance to industry and the impact of Paul Paris' contributions must be considered in this context. Following, in my opinion, are the three most notable contributions of Prof. Paris and their relevance to industry.

- Paul Paris was the first to identify the use of ΔK to characterize fatigue crack growth behavior in structural components. He was the first to also discover the concept of threshold stress intensity for fatigue crack growth used widely today in design across several industries. One can credibly argue that these discoveries were as fundamental and impactful in understanding of fatigue as the Wohler Diagram itself. They revolutionized the design and structural integrity assessment methods in the aeronautical and aerospace industries, fossil power generation equipment, biomedical, and nuclear power generation industries.
- In the mid to late sixties, Paris and co-workers produced stress intensity solutions for a variety of practical configurations. These developments are the basis for application of fracture mechanics in testing materials and applying them in component assessment. Several standards were produced by the American Society for Testing and Materials (ASTM) based on these developments. I would particularly note a paper entitled "Stress Analysis of Cracks" that appeared in an ASTM publication in the mid nineteen sixties that must have, by my estimate 10000, if not more, citations. His "Handbook of Stress Intensity Parameters" co-authored with George Irwin and Hiroshi Tada has got to be best seller in the field. In addition, it is a testimonial for how deeply Prof. Paris cared about practical applications of his theories. You will find a copy of this book on the shelf of every practitioner of fracture mechanics.
- The "Hutchinson-Paris Theory for J-Controlled Crack Growth" is acknowledged as the seminal work on which the use of J-Integral for predicting stable crack growth and fracture in metals is based. This work put on firm ground the theories proposed for tackling fracture under elastic-plastic and fully plastic conditions proposed earlier by none other than some of Prof. Paris' own students that included names such as Jim Rice, John Landes, Jim Begley, and Hugo Ernst. All of these names are very recognizable names in the field of fracture and all have received the prestigious George Irwin Medal and many other honors for their own pioneering contributions to the field of fracture mechanics.

Prof. Paris' work stands out not only in fracture mechanics but in the broader field of Engineering Mechanics and is equally relevant to the field of Materials Science. This has made Prof. Paris extremely well known in both disciplines. For these reasons and for his outstanding ability to communicate his ideas in simple terms to practicing engineers, Paul Paris has my very enthusiastic support for award of the Wohler Fatigue Medal. If I can be of any further assistance, I hope you will contact me.

Sincerely yours,



Ashok Saxena, PhD
Provost and Vice Chancellor of Academic Affairs and Distinguished Professor