membership in MRS, and a unique trophy—a mounted ruby laser crystal, symbolizing the many faceted nature of materials research. The award recognizes those qualities most prized by materials scientists and engineers—brilliance and originality of intellect, combined with vision that transcends the boundaries of conventional disciplines, as exemplified by the life of Arthur von Hippel (http://vonhippel.mrs.org).

Robert O. Ritchie selected for 2013 David Turnbull Lectureship

The Materials Research Society's David Turnbull Lectureship recognizes the career of a scientist who has made outstanding contributions to understanding materials phenomena and properties through research, writing, and lecturing, as exemplified by the late David Turnbull of Harvard University. This year Robert O. Ritchie, H.T. & Jessie Chua Distinguished Professor of Engineering in the Department of Materials Science and Engineering at the University of California (UC)–Berkeley, has been selected to give the 2013 Turnbull Lecture. Ritchie is cited for his "pioneering contributions to, and teaching us all how to think about, the mechanistic role of microstructure in governing fatigue and fracture in a variety of materials systems, and communicating his scientific insights to the world audience through eloquent lectures and seminal publications." Ritchie will be presented with the award at the 2013 MRS Fall Meeting in Boston.

Ritchie's ability to simplify and categorize very complex fracture and fatigue behavior into understandable and tractable regimes that can be modeled are a hallmark of his contributions. He brought a new understanding to the fundamental mechanisms of fatigue in a wide range of engineering materials, from metallic alloys (specifically aluminum, titanium, nickel, and especially steels), intermetallics (e.g., γ-TiAl), ceramics (PSZ, Al_2O_3, Si_3N_4, and SiC), and the interfaces between them. In particular, he helped elucidate the role of microstructure, loading parameters, and environment on fatigue crack growth behavior. His research led to a new understanding of both the intrinsic fatigue processes ahead of a growing crack and the extrinsic (shielding) processes acting behind the crack tip. These could then be separated, quantified, and modeled. This seminal work helped create a new framework for understanding the fracture and fatigue properties of a wide variety of materials. Furthermore, Ritchie has made very significant advances in applying this understanding to predicting fracture and fatigue in engineering structures and biomedical devices, including the structural integrity of cardiac valve prostheses.

About 10 years ago, Ritchie recognized the urgent need to better understand fracture mechanisms of bone and the potential of applying and adapting the knowledge acquired over many years of research on fatigue fracture of ceramics and ceramic composites. To approach this problem, Ritchie and his collaborators adapted the concept of R-curves to biological materials. In this work, crack ligament bridging was recognized as a major contribution to the toughness of (fibrous) bony materials. Ritchie postulated intrinsic and extrinsic contributions to toughness, where "intrinsic" refers to material behavior preventing the nucleation of a critical crack, while "extrinsic" contributions hinder the propagation of an already developed crack, such as by crack deviation or ligament bridging.

Ritchie established global leadership in the field of fracture and fatigue through dedicated service, the organization of international events, and co-editing 19 books on the subject resulting to a significant extent from conferences in which he was involved in a leadership role. He has furthermore been an inspirational teacher and mentor for a generation of students, first at the Massachusetts Institute of Technology, and subsequently at UC–Berkeley.

In addition to his professorship at UC–Berkeley, Ritchie is Senior Materials Scientist in the Materials Sciences Division of the associated Lawrence Berkeley National Laboratory, and a member of the University of California–San Francisco/University of California–Berkeley Bioengineering group. He is a member of the US National Academy of Engineering and a Fellow of the UK Royal Academy, among numerous other honors.

From Cambridge University, he received his BA degree in physics and metallurgy, MA and PhD degrees in materials science, and a Doctor of Science degree. He has served as a consultant for both government and industry, including for such companies as Allison, Boeing, Chevron, Exxon, Garrett Turbine, General Electric, General Motors, Grumman Aerospace, Instron, Rockwell, Rolls-Royce, Teledyne, Westinghouse, and numerous legal firms. Ritchie has also acted as a consultant in the medical field to Baxter Healthcare, Cordis, Carbomedics, Guidant, Edwards, Sorin, and St. Jude Medical on the mechanical integrity of prosthetic devices. In addition, he has served as a member of several National Research Council Committees including "Advanced Space Technology" and "Small Spacecraft Technology."

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