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4:00 – 5:00pm
Wilsdorf Hall, Rm 101

Metal Fatigue *The Next Decade*

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ABSTRACT:

The vision for next-generation prognosis of the fatigue health of high performance metals in aerospace and energy systems requires materials science advances yet to be realized; particularly, damage mechanism-based modeling of fatigue properties and inclusion of the strong role of chemical environment. Scientific opportunities abound across several disciplines and length scales. Research at UVA is centered on aluminum alloys and includes: (a) prediction of the temperature dependence of crack growth based on mass transport/reaction-rate limited modeling leading to better life assessment, (b) high resolution characterization of fatigue crack path crystallography (SEM/EBSD) and crack tip dislocation structure (FIB/TEM) leading to a better-informed damage physics model, (c) measurement of crack formation and growth from corrosion damage leading to a validated microstructure-scale model of fatigue, and (d) ionic inhibition of hydrogen uptake at a crack tip leading to smart healing of fatigue and reduced prognosis complexity.

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