

# DEPARTMENT OF MECHANICAL ENGINEERING

## WILLIAM MAXWELL REED SEMINAR SERIES

### “Bourbon and Spacecraft”

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University of Kentucky

**Abstract:** The flavor profile of bourbon is known to originate from three different sources: The mash bill, the yeast fermentation, and the oak barrel. It is estimated that the barrel contributes to about 50-70% of a bourbon’s flavor profile. However, among these three factors, controlling the flavor obtained from the barrel is the most challenging. Bourbon barrels are legally required to be charred in order to qualify to age bourbon. The charring process is known to influence the flavor of the bourbon during the aging process. In this study, the heat treatment of White Oak bourbon barrels is modeled using a 3D advanced material response solver, originally developed to model the heat shields of spacecraft. The developed model allows for comprehensive simulations of the toasting and charring processes, and link the results to molecules of importance to the flavor profile spirits (e.g. aromatics). This increased understanding of the thermal treatment of bourbon barrels directly inform ongoing efforts to improve the barrel charring process and thus, will yield better control over the final commercial product.

**Bio:** Alexandre Martin obtained a B.Sc. in Physics in 1998 from the University of Montréal (Québec, Canada), and a Master and Ph.D. from the Department of Mechanical Engineering at École Polytechnique de Montréal (Québec, Canada). He worked primarily on plasma ablation, with an application on industrial high-voltage circuit-breakers. After continuing this work as a Research Associate at École Polytechnique for a year, he then moved to the University of Michigan (Ann Arbor, MI), where he worked on the material response of atmospheric re-entry vehicles. Since January 2010, he is a faculty member in Mechanical Engineering at the University of Kentucky (Lexington, KY). His main research areas are entry physics, heat shield modeling, fluid dynamics and porous media. Dr. Martin has published more than 120 peer-reviewed archival journal and conference papers, and is regularly invited to give presentations on ablation.

He also enjoys bourbon.

**Date:** Friday, Apr. 10<sup>th</sup>

**Place:** Zoom <https://uky.zoom.us/j/535433078>

**Time:** 3PM

**Contact:** Dr. Alexandre Martin 257-4462

Meet the speaker and have refreshments  
Attendance open to all interested persons