

# **“The Physics of Music”**

**Norm Buchanan**

**Colorado State University**

Monday, November 6th at 4:00 PM

120 Engineering (Hammond Auditorium)

## **Abstract**

There are few things that permeate our lives in the way that music does. Whether it is a familiar song that conjures up memories from our youth, or the enhanced emotional impact that a well-crafted film score has on a movie scene, it is hard to deny the role that music has on all of us. In this talk I will try to separate the subjective from the objective and explain how the musical sounds we hear are connected to fundamental physical concepts. I will put these concepts into the context of the varied tonal characteristics of musical instruments and the harmonic combination of musical notes. Additionally, I will discuss sound design and how current and emerging technologies enable the reproduction of the sounds of existing musical instruments, as well as unique and undiscovered sounds that composers will be able to employ in their work.

## **Biography**

Norm Buchanan is a Professor in the Department of Physics at Colorado State University specializing in Particle Physics and High-Performance Computing. He received his PhD from the University of Alberta in 2003 and worked on the ATLAS experiment at the LHC and the DZero experiment at Fermilab before moving to neutrino physics. Since joining the CSU faculty he has been studying neutrino physics as part of the T2K, NOvA, and DUNE collaborations. Buchanan has held leadership roles on several particle physics experiments including Run Coordinator for the DZero and T2K experiments, as well as various physics and project leadership roles. He has contributed to nearly 400 refereed publications and shared in the 2016 Breakthrough Prize in Fundamental Physics with fellow members of the T2K collaboration for improving the understanding of neutrino oscillations. In 2019 he also shared in the European Physical Society High Energy and Particle Physics prize with his fellow DZero collaborators for work leading to an improved understanding of the top quark. Following high-school, Buchanan studied jazz guitar performance for two years at Capilano University in Vancouver, Canada, before moving on to study physics. He has taught music and continues to study contemporary music composition and scoring for film and television. He is very interested in the connections between music and physics, and music technology in general.