

**Johns Hopkins University, Department of Mechanical Engineering
2020 Fall Virtual Seminar Series: Class 530.803**

Thursday, September 10, 2020 | 3:00 PM via Zoom

<https://wse.zoom.us/j/91752450849>

Meeting ID: 917 5245 0849 | Passcode: 605594

**“Self-Induced Extreme Hypoxia in the Death Galaxy and the
Emergence of Cancer Resistance”**

Presented by [Professor Robert Austin](#)

Professor of Physics, Princeton University

The interior of a tumor is a hard place for cells to survive: acidic, extremely low oxygen concentration, low nutrients. It should be a place of death, and it is, but it is also an incubator for highly resistant cells which can survive under these extremely stressful conditions. Ironically which comes out of this extreme environment are cells which are probably the seeds for destructive metastatic invasion. I'll describe a micro fabricated device which replicates the extreme gradients of stress that a tumor has, and a phosphorescent film which can measure as a function of space and time the internal hypoxia which a cancer cell line can spontaneously generate. High resolution imaging is used to monitor the response of the cells to extreme hypoxia stress and what happens when the hypoxia stress is released. Implications of this work for the emergence of highly stress resistant metastatic cancer cells will be discussed.



Robert Austin graduated from Hope College, Holland, Michigan, with a BA in Physics, 1968. He received his Ph.D. in physics at the University of Illinois, Urbana, IL in 1975. He was a post-doc at the Max Planck Institute for Biophysical Chemistry, Goettingen, (West) Germany from 1976-1979. He returned to the US as an Assistant Professor of Physics in 1979, eventually becoming a Professor of Physics at Princeton. Amongst his honors, in 1988 he became a Fellow, American Physical Society, in 1998 he was made a Fellow, American Association for the Advancement of Science, in 1999 he was made a Member, National Academy of Sciences. He was awarded in 2005 the Lilienfeld Prize of the American Physical Society, in 2008 he was made a Fellow, American Association of Arts and Sciences. In 2014 he was awarded the Max Delbruck Prize in Biological Physics of the American Physical Society.