

Cross-Fertilization: Electrostriction, Devonshire and High Temperature Transducers

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During his long career, Eric Cross had a profound influence on the research direction of not only his immediate co-workers, but also of ferroelectrics researchers around the globe. In this reminiscence, four examples will be described from personal experience of how his subtle suggestions and hints grew into significant research directions with positive outcomes.

His welcome intervention into a PhD project, some 35 years ago, resulted in the first complete set of 6th order Landau-Devonshire coefficients for BaTiO₃, giving the correct transition temperatures for all the ambient pressure phase transitions, and which 16 year later, again at his suggestion, enabled an accurate model of the properties of domain engineered BaTiO₃ crystals.

His 2002 suggestion to revisit the BiFeO₃-PbTiO₃ system has, after a dozen years of research, resulted in a new business building transducers for *in situ* corrosion and crack monitoring in high temperature plant.

Finally, the presentation will return to an early memory of Eric Cross, atop a volcano in Sicily, introducing the topic of electrostriction to students who almost “didn’t know a dielectric from a hole in the ground”. Nearly 40 years later, one of those students will demonstrate how he maybe finally understands the origin of electrostriction and the relationship between compliance, permittivity and the electrostriction coefficient.