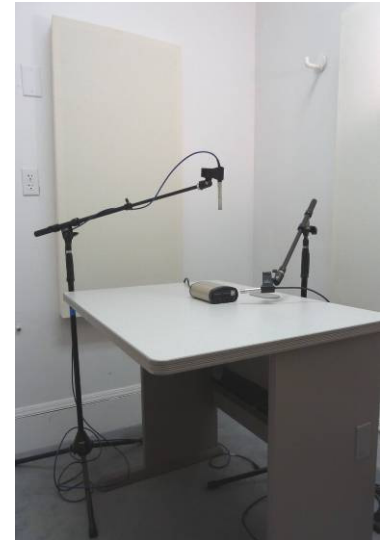


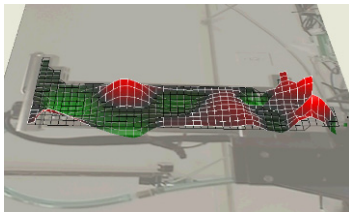
## VACC Recent Key Projects: Product noise and vibration design and troubleshooting

Many consumer products generate unwanted sound and vibration. Sometimes, products are too loud; sometimes they are too quiet; and sometimes they “just don’t sound right”. Sound quality is an important parameter that gets to customer psychology, going beyond basic quantitative metrics like “loudness”. From [regulatory compliance](#) to consumer expectations, we can help make your product a success. *Below we discuss some of our recent work; names of manufacturers and products are obscured for confidentiality.*

**Drug delivery device** (personal pharmaceutical dosing): impulse noise characterization for a new drug delivery system that caused a loud snapping sound. The manufacturer was concerned that the poor sound quality might reduce consumers’ expectations and could even elicit involuntary startle responses in patients. We performed detailed acoustical characterization of different product configurations in order to determine relative noise levels and extremely-short-duration impulse noise characteristics.



**Cold compression therapy system** (personal medical device): noise characterization for a pump supporting a pain management appliance. The manufacturer had recently upgraded the device and was concerned about sound quality of the newer version. We performed testing to quantify noise emission and sound quality to guide future product development.



**Household power generator** (consumer durables / alternative energy): product noise testing for a small fuel cell developed for home use. Similar in size to an air-conditioning condenser, the unit is intended to sit in homeowners’ backyards. [Outdoor noise](#) impact on adjacent homes was of concern to the manufacturer. We helped define an appropriate criterion intended to minimize

conflicts between customers and their neighbors, and generated high-quality noise data for different product configurations. The data allow customers and their consultants to calculate noise impact and avoid violations of [noise ordinances](#).

**Electrostatic OEM component** (consumer gadgets): noise characterization for a small embedded OEM component that utilized high voltage fields. Airborne particles occasionally caused the system to arc, creating short transient impulse sounds (crackling) with very short durations of less than 1ms. The manufacturer was concerned that the emitted sounds might turn off some potential customers. We devised a high-sample-rate [noise testing methodology](#) that captured noise related to the sparking and returned both time-domain as well as frequency-domain information. Frequency content data were especially important to guiding development of mitigation strategies.

