



## Society of Applied Spectroscopy New England Section

### 2018 February NESAS Meeting Announcement

When: Tuesday February 6th, 2018  
5:30 – 6:30 Social Hour with Appetizer  
6:30 – 7:30 Dinner  
7:30 – 8:30 Presentation & Discussion

Where: **110 Grill, 116 Chelmsford Street**  
**Chelmsford, MA 01824**  
**978.256.2777**

Speaker: Dr. Richard Crocombe  
Crocombe Spectroscopic Consulting  
Winchester, MA

Title: **Handheld Vibrational Spectroscopy: The Present and the Future**

#### Abstract:

Until very recently, handheld spectrometers were the domain of major analytical and security instrument companies, like Thermo Fisher Scientific and Smiths Detection, with turnkey analyzers using spectroscopic techniques from x-ray fluorescence (XRF) for metals to Raman, mid-infrared and near-infrared for organics. However, the past few years have seen rapid changes in this landscape with the introduction of handheld laser-induced breakdown spectroscopy (LIBS), ‘smartphone spectroscopy’ focusing on medical diagnostics for low resource areas, a commercial MEMS FT-near-infrared engine, implementation of Texas Instruments’ DLP chip for the near infrared using a Hadamard scheme, ‘hyphenated’ or dual technology instruments, and some low cost visible/near-infrared instruments selling directly to the public.

Successful handheld instruments are designed to give answers to non-scientist operators, and therefore their developers have put extensive resources into reliable identification algorithms, and qualitative and quantitative calibrations. LIBS builds on more than 60 years of experience in optical emission (arc-spark and inductively-coupled plasma) spectroscopy, while smartphone spectroscopy leverages existing colorimetric assays and their ‘chemistries’. Handheld near-infrared analyzers have similarly built on the decades of calibrations on laboratory instruments in food, feed and agriculture. The low-cost consumer instruments use a different model: crowd-sourcing for the company, and also crowd-sourcing for the data, with analysis in the cloud, not on the instrument itself.

This talk outlines the portable spectrometer field, and discusses generation of databases, calibrations and algorithms, and also provides caveats on crowd-sourced data, especially for heterogeneous samples.

**Speaker Biography:**

Richard Crocombe graduated from Oxford University (BA, MA, chemistry) and the University of Southampton (PhD, chemistry & spectroscopy) in the UK. He moved to the US, initially for a postdoctoral fellowship, and then joined Digilab (Bio-Rad) working on laboratory FT-IR. He held numerous positions at Digilab over the years, but concentrated on product and applications development, including step-scan FT-IR applications and spectroscopic imaging using two-dimensional focalplane array detectors. About fifteen years ago he changed course to concentrate on miniature, portable and handheld spectroscopic instruments, working at Axsun Technologies (tunable near-infrared lasers), Thermo Fisher Scientific (XRF, Raman, FT-IR, near-infrared), and finally PerkinElmer (portable GC-MS). In 2017 he left the corporate world to set up his own consulting company, helping to commercialize new miniature spectroscopic technologies.

**Dinner Details:** Attendees will be ordering and paying for their own meals from the restaurant menu. Please RSVP to Vincent Lee at [vincentlee@nesas.org](mailto:vincentlee@nesas.org) so that we can be sure of a headcount and the room's physical arrangement for the talk.

**Cost:** SAS Members \$5; non-SAS members \$10; full time students and unemployed members \$5.

**Contact:** Due to capacity seating limitations, an RSVP is suggested. Please contact Vincent Lee at [vincentlee@nesas.org](mailto:vincentlee@nesas.org) if you have questions.