

# The Brave New World of Intelligent Handheld Analytical Instruments

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## Summary

Instrumental analytical chemistry is changing, and that change is accelerating. However, the transformation that has been transpiring has to a significant extent been happening on the periphery of the purview of laboratory analytical chemists. A cascade of advances over the last 15 years have given rise to handheld versions of the laboratory spectroscopy standards of FTIR, NIR and Raman spectroscopy and more recently LIBS and mass spectrometry. Separation technologies have also collapsed to the micro-scale. The miniaturization of all of these extraordinarily powerful technologies is giving rise to entirely new applications and categories of users that are sometimes far afield from anything resembling analytical chemistry.

This seminar will review the historical hardware advances that have enabled these developments, and provide insight into the critical and complex systems in analytical informatics/chemometrics and automation that play in these success stories. Analytical chemistry and chemometrics has a tremendous opportunity to drive these developments now and into the future, to lead the advances in analytical technology and informatics that will give rise to the next wave of opportunities, but the community must capitalize on these opportunities quickly. The author will share personal experiences and thoughts on this front.

The speaker will have a number of these handheld systems with him, including Raman, FTIR and MS to illustrate a number of the discussed challenges and opportunities.

## Speaker Bio

Chris has been involved with academic and commercial efforts to miniaturize a range of complex analytical systems for the last 20 years. An integral focus of his work has been in the information theoretic and chemometric frameworks that allow these systems to self-govern, and provide analytical answers.

He is currently the Chief Technology Officer at 908 Devices developing handheld mass spectrometry-based systems. Prior to co-founding 908 Devices, he was a platform architect at Apple in California leading design and development investigations for future-gen Apple product concepts, and advanced hardware/software technologies. From 2004 to 2010 he was with Ahura Scientific (later Thermo Fisher Scientific) developing handheld Raman, FTIR and NIR devices as

Senior Director of Product Development and Engineering. Prior to Ahura he worked in medical device arena on miniature intelligent systems for *in-vivo* biodiagnostics, metabolic monitoring and clinical chemistry.

Chris received his BSc. In chemistry and mathematics from Brandon University, and Ph.D. in Chemistry from Dalhousie University. He has published approximately 150 scholarly papers and conference presentations, and has more than 50 granted/pending patents. He remains active in numerous professional associations, societies, conferences and advisory boards, and is a member of the Editorial Board for the Journal of Chemometrics.