University of Minnesota
Driven to Discover℠

Department of Chemistry

Seminar

9:45 a.m. Thursday, January 29, 2015 • 331 Smith Hall

Post-Doctoral Fellow

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New Materials and Devices for Chemical Sensing

Abstract

Development of portable chemical sensors is a critical part of managing and protecting the environment, human health, safety, and quality of life. This seminar will describe two distinct and complementary technological developments for enabling simple, inexpensive, low-power, wireless chemical sensing with potential applications in chemical and biochemical analysis, environmental monitoring, and protection of public safety. The first part of the seminar will focus on the development of an extremely simple and portable method that uses magnetic levitation for density-based chemical analysis. Applications of this technology in the context of monitoring chemical reactions on solid supports, detecting binding of proteins to resin-bound ligands, and density-based separations will also be discussed. The second part of the presentation will describe an entirely solvent-free approach for rapid prototyping of selective chemiresistive sensors from carbon nanomaterials on the surface of paper and plastic. This procedure makes it possible to fabricate functional gas sensors from commercially available starting materials in less than 15 minutes. The simplicity of this fabrication method enabled discovery of several novel formulations for selective gas and vapor sensors, and led to rapid integration of these materials into wireless chemical sensing devices that can be interrogated with a smartphone using radio frequency communication. Taken together, these developments may enable widely distributed chemical sensors with broad utility in chemical analysis, environmental monitoring, diagnosis of disease, and protection of public safety.

Host: Professor Philippe Buhlmann
Refreshments will be served prior to the seminar.