# Arsenic and Chromium Speciation in an Urban Contaminated Soil

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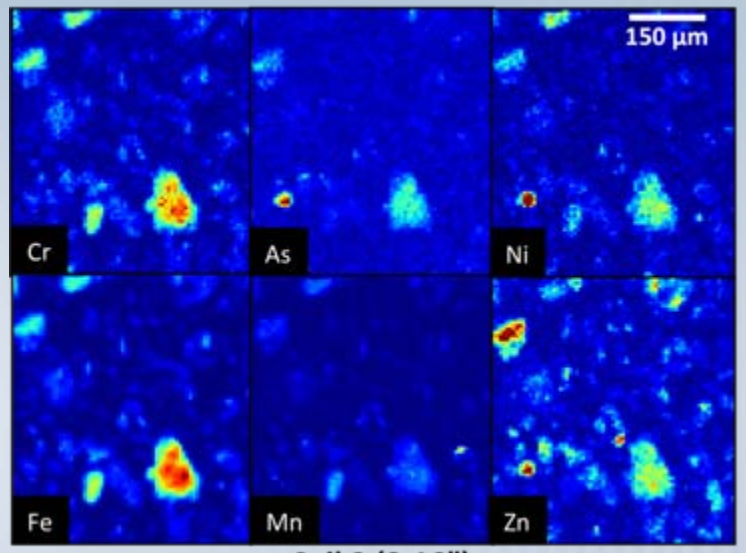
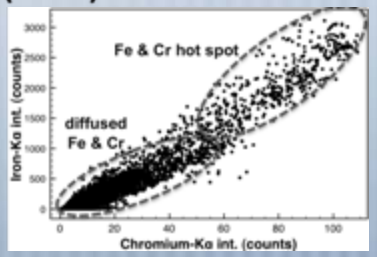
- Wilmington, DE was one of the capitals of the leather tanning industry on the American East Coast from the late 1800's to the early 1900's. Arsenic and chromium compounds were used at various stages of the tanning process, and these toxic elements are often found at high concentrations in soils at former tanning factories including the location currently occupied by Christiana park.
- By applying a suite of hard X-ray microprobe techniques such as X-ray fluorescence imaging (XRF), X-ray absorption spectroscopy (XAS), and X-ray diffraction (XRD), the team led by U. DE determined the mineralogical associations and chemical speciation of As and Cr in the soil profile at Christiana Park. Chromium was present in the non-toxic Cr(III) form and incorporated with stable iron oxides. Arsenic was mainly present as As(V) species that were sorbed or occluded in Al-oxide minerals (e.g. mansfieldite).
- Results indicate that Al and Fe phases control the distribution of As and Cr in the contaminated soils at Christiana Park. These measurements are important to help state and federal regulatory agencies assess the potential risk to humans of exposure to high concentrations of As and Cr from the soil.




Soil 2 (8-16")




XRF images showing the spatial distributions of Cr, As, Fe, Mn, Zn, and Ni in subsurface soil (8-16" depth) collected from Christiana Park in Wilmingon, DE plus the Fe/Cr correlation extracted from the XRF image.

Landrot, G. 2010. Ph.D. dissertation. University of Delaware, Newark. Kinetics and mechanisms of chromium (III) oxidation and precipitation on manganese oxides, in real-time and at the molecular level. Landrot, G. , R. Tappero, S. Webb, and D.L. Sparks. 2010. Arsenic and Chromium Speciation in an Urban Contaminated Soil (submitted to Env. Sci. Technol)

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