

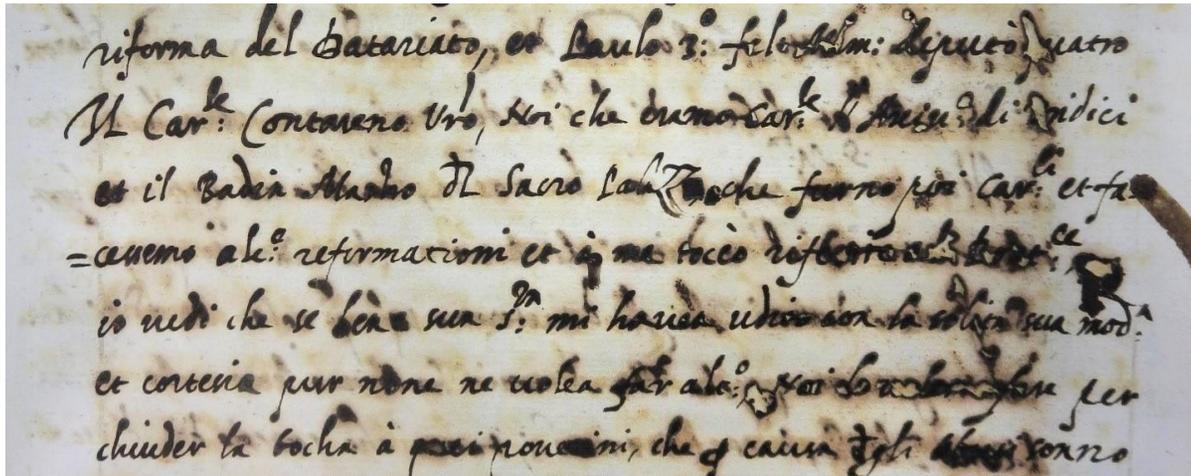
# Modelling the degradation of iron gall ink and historical paper

Yun Liu

Ph.D. Science and Engineering in Arts, Heritage and Archaeology (SEAHA)  
University College London

Postdoctoral Fellow

Smithsonian's Museum Conservation Institute



A 17<sup>th</sup> century manuscript damaged by iron gall ink corrosion (Credit: The National Archives, Kew, UK).

Iron gall ink was the most important ink used in Western history; it was the ink of choice for writing on paper and parchment from the early Middle Ages until the beginning of the 20<sup>th</sup> century. Unfortunately, its chemical instability leads to multiple types of degradation that are major concerns for collection management: ink corrosion of paper, ink fading, and paper discoloration. To gain insights into the kinetics of the degradation processes, this presentation explores dose-response modelling to quantify the effects of the environmental factors—temperature, relative humidity, oxygen concentration, and illuminance—on ink and paper behaviors. Accelerated and natural degradation experiments were used to acquire data for the models. Visualizations of the models were created to allow effective communication and implementation in practice. These models extend the understanding of the degradation of iron gall ink-containing paper from tightly controlled laboratory samples to naturally degraded historical samples, and from single-factor effects to synergistic effects of multiple factors.

**MCI**  
*Topics in  
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**October 17, 2019**  
**10:45 am**  
**Thursday**

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301-238-1240



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