Net.Create: Using Network Analysis to Support Digital Humanities Learning in Large History Classrooms  
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Network analysis is an increasingly popular tool for digital historians to represent and analyze historical contexts because it supports scholars in looking at a broad range of connections between people, places, and events. These people, places, and events are entered into a computer and represented as nodes in a diagram that is connected via lines called edges, which allow users to explore patterns in which nodes are connected to each other, and how. While humanities pedagogues are optimistic that the affordances of network analysis tools provide unique opportunities for supporting students in learning history, available tools do not support easy integration into humanities classrooms, and there is little empirical or theoretical support for how this might be accomplished. The Net.Create project aims to both open up this new genre of scholarship to undergraduate history students and provide a research base for activities that effectively integrate network analysis into history classrooms. Our initial proposal, submitted to NSF’s CyberLearning EXP program, aimed to develop Net.Create, a new, easy-to-use network analysis and visualization tool, and pedagogical support for that tool within a wide range of historical contexts. The Net.Create tool aims to bridge gaps in technical expertise, visualization integration and the use of network visualization in history classrooms by providing a scaffolded, easy-to-use interface and curricular materials that are designed from the ground up to be successfully implemented in a lecture classroom. The tool would explicitly support student generation of network data from a historical text as a way of helping students to see the challenges of interpreting the evidence in a historical text and transforming it into a digital format, as well as the value that network analysis as a digital approach has in understanding the complexity of historical interactions. We will then use this new tool to systematically test the potential of network analysis as a new genre for learning in the humanities and to better understand how complex network visualization tools mediate learning and engagement in undergraduate humanities classrooms.

Advancing the Science of Protein Cross-Linking  
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It is crucial to understand the interactions that occur between proteins in cells, and a method to study them that is growing in importance is cross-linking mass spectrometry. Nevertheless, the isolation and identification of protein cross-links is filled with challenges. The goal of the
The present work is to confront these challenges in order to identify a larger number of cross-links with a higher degree of confidence from every sample that is investigated. Attempts will be made to understand the fragmentation patterns that cross-linked peptide ions generate. The characteristics of several imidoester cross-linkers, some of which have not been previously synthesized, will be investigated. Their performance relative to more conventional commercially available succinimidyl ester linkers will be evaluated. Some of the cross-linkers will be utilized in in vivo experiments involving E. coli. Isoelectric focusing of cross-linked proteins will be employed to isolate and distinguish them from unlinked proteins. Imidoester cross-linkers produce unusually highly charged cross-linked species. This will be exploited in chromatographic separations and will provide attractive targets for their electron transfer dissociation. While most experiments will involve electrospray ionization into a hybrid ion trap/orbitrap mass spectrometer, MALDI of chromatographically separated cross-linked peptides will enable time-of-flight mass analysis interfaced with VUV photodissociation to produce unusually rich fragmentation data for identifying cross-links. The previously perplexing problem of ultra-long cross links will be investigated.

Preliminary Development to Strengthen Federal Application to Support Practitioners Who Serve Toddlers with Autism

Hannah Schertz, Department of Curriculum and Instruction

The project is to develop curriculum materials that will be used in an anticipated federally funded development project entitled Supporting Early Interventionists of Toddlers with Autism to Build Family Capacity expected to be funded by the Institute for Education Sciences of the U.S. Department of Education. This preliminary development work will bolster the success of this future federally funded project and our preparedness for a subsequent randomized controlled trial or, if not funded, a framework for a publishable curriculum to support the work of practitioners who provide services to families of toddlers with autism.