I’ve been doing some exciting research that I’ve wanted to write about for some time. I’ve been working with Professor Blaine Greteman at the Stanford Humanities Center on the [Shakeosphere Project](https://shakeosphere.lib.uiowa.edu/).

Shakeosphere investigates the relationships between early modern authors, printers, publishers, and booksellers. We can think of all of these individuals as nodes in a network. If two individuals share a publication, then we can draw a line connecting those individuals. Based on extensive data from the [English Short Title Catalogue](http://estc.bl.uk/F/?func=file&file_name=login-bl-estc), we can construct entire networks containing nearly all the individuals involved in early English print. These networks in turn provide a good approximation for the professional, public relationships between these individuals.

Once we generate these networks, we can perform some statistical analysis. For example, we can compute the shortest path through the network between two individuals, including the hubs that connect two individuals together:

We can also compute some statistics on a network as a whole. One useful statistic is the amount of connectivity in the network. An unconnected network has very few connections between nodes in the network, indicating that the individuals are not collaborating very much, or even that they are not aware of each other. A connected network has many connections between nodes in the network; intuitively, it is easy to see that ideas and information spread much more easily through a connected network.

When a network reaches a certain level of connectivity, most of the nodes in the network become connected to each other and the network forms something called a Giant Connected Component (GCC). A connected component is a subset of the nodes in the network where a path exists between each pair of nodes. Many networks usually transition from a highly unconnected state to a state with a single GCC consisting of most of the nodes in the network.

When we break up the Shakeosphere network by year and look at the percentage of nodes contained in the GCC, we can see a clear phase transition from unconnected to connected:

What is exciting is that the explosion of connectivity, roughly between 1580 and 1620, coincides with what is usually considered the high Renaissance in England! This is the period when writers like William Shakespeare, John Donne, Christopher Marlowe, Ben Jonson, Edmund Spenser, and many others were producing some of the most famous works in English literature.

According to these results, these writers would also have had access to an unprecedented level of connectivity among printers, publishers, and booksellers. Not only would they have been exposed to a much wider amount of printed texts, but their own printed texts would have circulated throughout a highly connected and collaborative environment as well.

Conceptions of the Renaissance tend to range from a gradual transition taking place over centuries to a more explosive phenomenon, taking place over a few decades, or even a few years. This phase transition in the English print network, which is only one (important) part of Renaissance culture, tends to support the latter notion.

Even when taking into account survivability rates for books during this period, our data seems to suggest that the print network grew in terms of both the volume of material produced and the connectivity of the network over a very short period of time. The dramatic growth of print technology between the 16th and 17th centuries is not unlike our own digital revolution, producing a generation of writers and thinkers different from their predecessors. If anything, this data shows that the Renaissance is a fascinating time period for future study and research!