Impact Report:

Discover How the Gale-ASECS Fellowships Expanded Research Possibilities

Read How One Fellow Used Digital Humanities Tools to Analyze Number Terms Used During the Eighteenth Century

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Gale-ASECS Non-Residential Fellowship

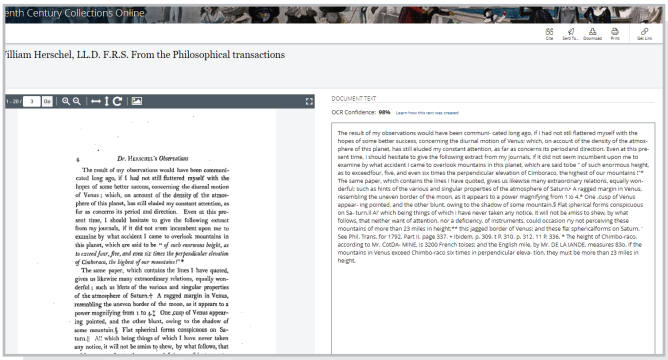
MEET THE SCHOLAR

As one of five researchers awarded a fellowship from Gale and the American Society for Eighteenth-Century Studies (ASECS) in 2022, Sarah Weston used digital humanities tools to examine eighteenth-century poetry and art through the lens of mathematics. Weston's project, "The Shape of Numbers, 1701–1800," analyzes number terms to offer a new way to speak about the movement from the Enlightenment to Romanticism and the change of sensibilities that took place at the end of the eighteenth century.

All Gale-ASECS Non-Residential Fellowship recipients were granted access to Gale's *Eighteenth Century Collections Online* (*ECCO*) and *Gale Digital Scholar Lab* (the *Lab*) for a six-month period of research. *ECCO* is the most comprehensive online historical archive supporting eighteenth-century studies, connecting researchers to every significant English-language and foreign-language title printed in the United Kingdom between the years 1701 and 1800. The expanse of content housed in *ECCO* meets substantial research potential in the *Lab*, an industry-leading, text- and data-mining research environment that removes barriers to digital scholarship.

Fellows received training to use the text- and data-mining tools available in the *Lab* to explore *ECCO* and advance their work using digital humanities methods. Read on to see how Weston used this powerful cloud-based analysis platform to run meaningful analyses using digital humanities tools and make new discoveries.

GALE



Viewing a facsimile image along with downloadable OCR text side by side.

ENHANCING RESEARCH WITH DIGITAL HUMANITIES TOOLS

Weston's concentration during the Gale-ASECS fellowship supports her larger ongoing research examining the concept of number during the eighteenth century. "My current book project studies shifting attitudes to number from 1660 to 1840, perceiving a rift between early and late eighteenth-century thought about quantity across many different fields, from poetry and art to science and mathematics," noted Weston.

"'The Shape of Numbers' is a digital humanities offshoot of this project, using Natural Language Processing (NLP) tools available [in the *Lab*] and the open-access tool Voyant to track how approaches to number and quantity shifted across the century. The *Lab* particularly allowed me to identify and study a larger sample set than I was previously using and also helped me identify sources I had not been aware of that have now found their way into the final book project."

Weston outlines that implementing digital humanities tools into her project was a natural phase for a number-based analysis of eighteenth-century content. "It seemed like a necessary step to turn to digital humanities (which evaluates and considers literature numerically) and examine how quantitative methods could help me approach my research question," the scholar said.

> "The *Lab* was an invaluable tool for me as I worked on this project, and my work on this digital humanities project will help shape my work as it transitions from dissertation to book form."

HARNESSING THE POWER OF TEXT & DATA MINING

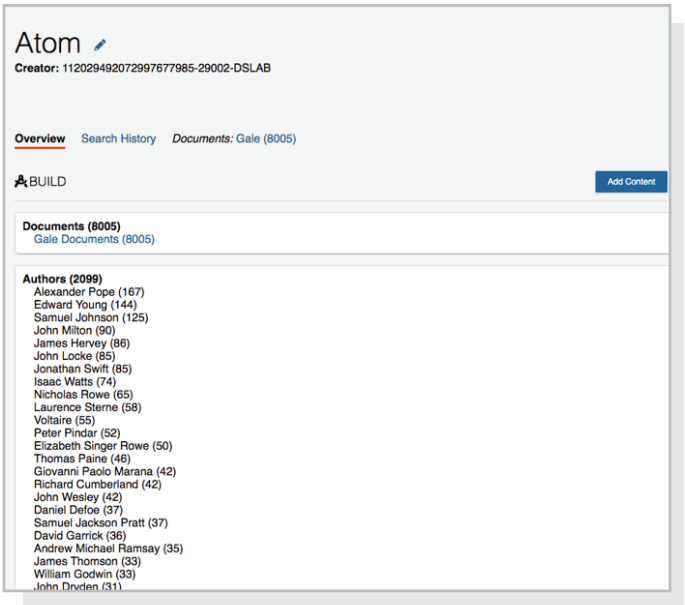
The Gale-ASECS fellowship provided Weston with the digital humanities tools and training she needed to take this next step in her research.

When thinking back on her experience before she had access to the *Lab*, Weston said, "My arguments had revolved around close readings of keywords, yet because I am studying a large-scale redefinition of what quantity meant over the century, I had been also trying to get a sense for all the ways quantity terms were being used in the period. The *Lab* really helped me expand my sense of all the types of genres of texts I could include within this project, from not just collections of poetry and philosophical works but treatises on art and mathematical textbooks, to books on garden design, children's books, and almanacs . . . I was able to find gaps in my current research and catch relevant uses of number terms in places I would not have thought to look in or in familiar areas that I had forgotten about."

Weston elaborated, "Beyond merely helping me create a better, larger data set, the *Lab* helped me organize, sift through, and make sense of the material I was working with . . . The ability to have the raw OCR [optical character recognition] text directly side by side with the facsimile image was so helpful to me as I was sifting through all these new texts. I could copy-paste the OCR text and cut down on my time typing as I was taking notes on useful items to circle back to. So the various elements and infrastructures of the *Lab* and its seamless integration with *ECCO* and the other databases I was looking at really helped me format and prepare texts for analysis."

"It was really staggering how quickly everything could be done," Weston added, outlining how the *Lab* helped streamline her research, including features like "pulling up the OCR text alongside the image from the database, being able to download files very easily, sort through the search based on OCR reliability, organize files into content sets very quickly, clean the OCR text, and analyze using so many different tools."

> "I was surprised and impressed by the wide variety of tools I could use to (almost instantaneously) analyze OCR text acquired through *ECCO*. The user interface (UI) was very approachable and navigable, and it was wonderful to see how seamlessly integrated *ECCO* was with the *Lab*'s interface."



Content set with list of authors and number of their works where "Atom" appears.

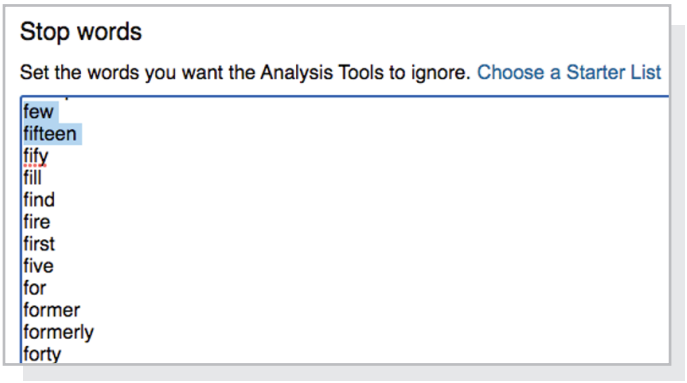
OVERCOMING CHALLENGES BY CUSTOMIZING CONTENT SETS

The *Lab* guides users through an intuitive research process in three steps: Build, Clean, and Analyze. In outlining her approach to building content sets, Weston said, "I had been working with just close-reading texts, discussing number words ('few,' 'many,' 'multitude,' 'infinite,' 'nobody,' 'one,' etc.) in very precise terms. But in transitioning to using the larger scale digital tools available in the *Lab*, I became truly aware of how vague some of these number words really are when tracked across such a wide collection of texts. Words like 'myriads,' 'hundred,' and 'thousands' might be easy to track, but something like 'half,' 'infinite,' 'few,' 'nobody,' and 'one' were almost impossible to track."

To help overcome this challenge, Weston said, "I ended up having to experiment with approaches and adapt the project to exclude certain terms and focus on more-delineated terms to try to get more-accurate results."

After refining her search criteria, Weston made new discoveries building her content sets. "I thought it was particularly fascinating to look at the content sets and see how the *Lab* will note a list of authors in the content set, along with a numerical value of how many of their works are in the set. Thus, I could essentially see how interested an author is in a given number word by just looking at how frequently their works found their way into the specific content set," Weston said.

> "I am so grateful for the opportunities this fellowship has afforded me—training me in so many different tools and so many new skill sets, and providing me with so many new experiences problem-solving and troubleshooting issues."

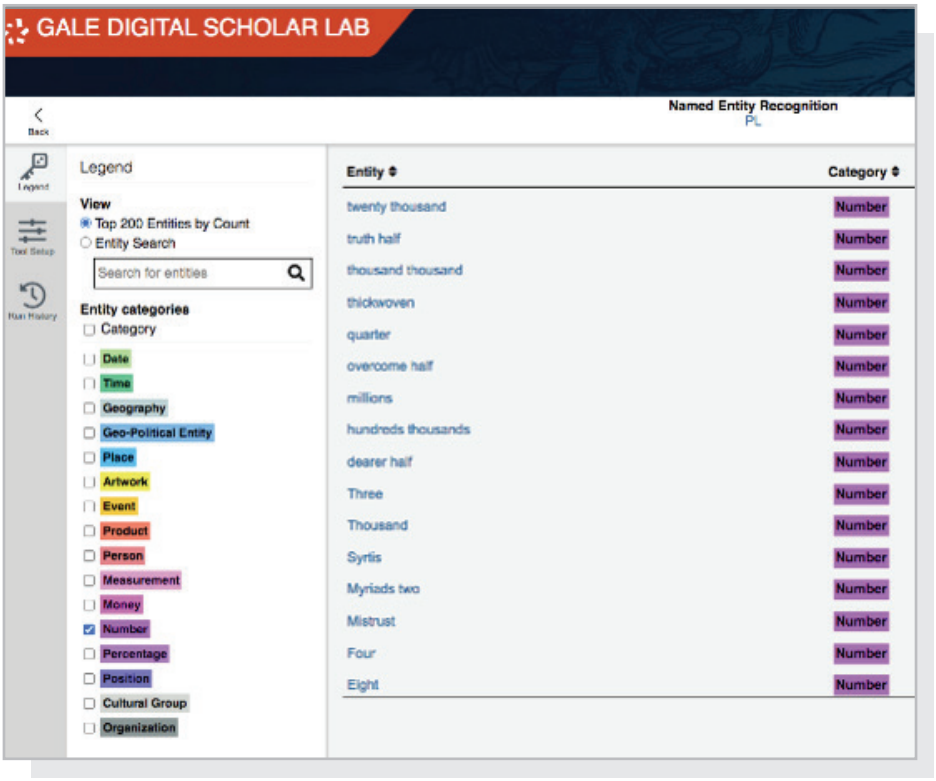


Cleaning the data by removing stop words from analysis.

PREPARING DATA FOR ANALYSIS

After users build their data sets in the *Lab*, they can customize their own cleaning parameters to prepare the data for analysis.

"The 'cleaning' tool was an incredible resource for me," Weston said. "Being able to remove punctuation, numbers, etc., instantaneously was an absolute game-changer. In one of my previous digital humanities projects, I was unaware of the ability to run cleaning configurations on OCR text and spent a lot of time meticulously sorting through it all and cleaning it up by myself, so I know how much time it takes to manually do all of this. The cleaning tool on the *Lab* saved me countless hours on this project, and I was really taken aback by all of it."



Named Entity Recognition filtered by Number.

> "After working with the different analysis tools available to me during this fellowship through the *Lab*, I feel newly invigorated to return to my in-process project, eager to use the new tools I have familiarized myself with in the interim."

FINDING NEW INSIGHTS WITH ANALYSIS TOOLS

When sharing how the Gale-ASECS fellowship benefited her research, Weston noted, "The most valuable aspect of this fellowship was the sheer wide variety of analysis tools I was able to work with. I began the fellowship not entirely knowing which method of analysis or approach would be the most helpful for me . . . I was really grateful to have all of these tools at my disposal as I was narrowing down what the most valuable approach would be."

Weston elaborated, "Named Entity Recognition ended up being one of the most helpful tools for me. I was not expecting this, as I previously assumed that Named Entity Recognition primarily was used for finding names of people and places. However, I was really pleased to see that I could also sort for 'Measurement' and 'Number,' which ended up yielding the most-fruitful results for my project."

DISCOVERING QUANTITATIVE DATA TO SUPPORT THEORIES

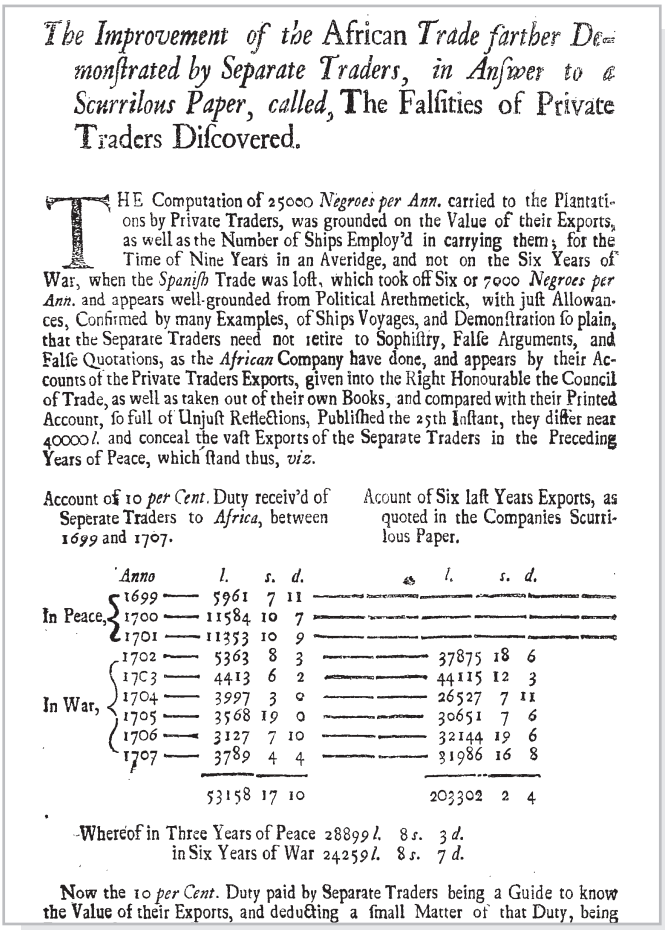
Working in the *Lab* gave Weston the tools she needed to confirm hypotheses she was unable to prove before the fellowship. "The biggest confirmation I had occurred when I was searching for 'heaps' and 'piles' and 'masses' and kept getting a very large number of hits on texts written on slavery and abolition," said Weston. "I had been previously studying the imagery of heaps as they were depicted by the abolition movement or in texts about slavery, but my sample size had been quite small (Equiano, Clarkson, etc.) and I had not been aware that it was even more pervasive than I had known. I would not have stumbled upon this information without using the *Lab*."

The *Lab* allowed Weston to find more quantitative data supporting her theory. "Now I can assert with confidence that many, many writers were using the same imagery and gravitating toward these specific words in abolitionist literature, at large," she said.

Giving a specific example, Weston noted, "One particular hit in this search came from a report on *The Improvement of the African Trade Farther Demonstrated by Separate Traders* [1708] . . .

the search had led me to an instance of a text written about slavery from the earlier eighteenth century that was not riddled with imagery of heaps, piles, masses, multitudes, etc., that I had become accustomed to seeing in later eighteenth-century texts."

Following this realization, Weston approached her research in a new way. "I began purposefully expanding my search to target just texts written earlier in the eighteenth century . . . I was able to find many other instances of this: texts that spoke about slavery but avoided those terms about numbers that skewed negative. This helped me ratify my initial assessment/hypothesis—that the imagery of piles and heaps and tortured masses, the anxious feeling about multiplicity and numerousness when discussing the slave trade was a sentiment unique to the late eighteenth century, emerging during the period of abolition, as a new attitude arose toward quantity and numbers: a new reckoning with the sheer magnitude of people affected by the slave trade."



The Improvement of the African *Trade farther Demonſtrated by Separate Traders, in Anſwer to a Scurrilous Paper, called,* The Falſities of Private Traders Diſcovered.

THE Computation of 25000 *Negroes per Ann.* carried to the Plantations by Private Traders, was grounded on the Value of their Exports, as well as the Number of Ships Employ'd in carrying them; for the Time of Nine Years in an Averidge, and not on the Six Years of War, when the *Spaniſh* Trade was loſt, which took off Six or 7000 *Negroes per Ann.* and appears well-grounded from Political Arethmetick, with juſt Allowances, Confirmed by many Examples, of Ships Voyages, and Demonſtration ſo plain, that the Separate Traders need not retire to Sophiſtry, Falſe Arguments, and Falſe Quotations, as the *African* Company have done, and appears by their Accounts of the Private Traders Exports, given into the Right Honourable the Council of Trade, as well as taken out of their own Books, and compared with their Printed Account, ſo full of Unjuſt Reflections, Publiſhed the 25th Inſtant, they differ near 40000*l.* and conceal the vaſt Exports of the Separate Traders in the Preceding Years of Peace, which ſtand thus, *viz.*

Account of 10 *per Cent.* Duty receiv'd of Seperate Traders to *Africa*, between 1699 and 1707.

	Anno	*l.*	*s.*	*d.*
In Peace,	1699	5961	7	11
	1700	11584	10	7
	1701	11353	10	9
In War,	1702	5363	8	3
	1703	4413	6	2
	1704	3997	3	0
	1705	3568	19	0
	1706	3127	7	10
	1707	3789	4	4
		53158	17	10

Acount of Six laſt Years Exports, as quoted in the Companies Scurrilous Paper.

	l.	*s.*	*d.*
	37875	18	6
	44115	12	3
	26527	7	11
	30651	7	6
	32144	19	6
	31986	16	8
	203302	2	4

Whereof in Three Years of Peace 28899*l.* 8*s.* 3*d.*
in Six Years of War 24259*l.* 8*s.* 7*d.*

Now the 10 *per Cent.* Duty paid by Separate Traders being a Guide to know the Value of their Exports, and deducting a ſmall Matter of that Duty, being

The Improvement of the African Trade Farther Demonstrated by Separate Traders, in Answer to a Scurrilous Paper, Called, *The Falsities of Private Traders Discovered*, 1708, *ECCO.*

CONSIDERING THE FUTURE POTENTIAL OF THE LAB

After training in the *Lab* and using it to support her research during the Gale-ASECS fellowship, Weston remarked that there are many opportunities ahead for her to utilize digital humanities tools. "I now have a new skill set that I can continue to hone and refine in both my research and my teaching," she said.

Considering her current book project, Weston noted, "I now have around 50 new texts that I have been able to close-read, study, and incorporate into my monograph. I was only able to find and identify these sources through using the *Lab* . . . I was able to expand the horizons of the project, reaching for new genres of texts that had previously not been on my radar. The project feels much richer now and more encyclopedic."

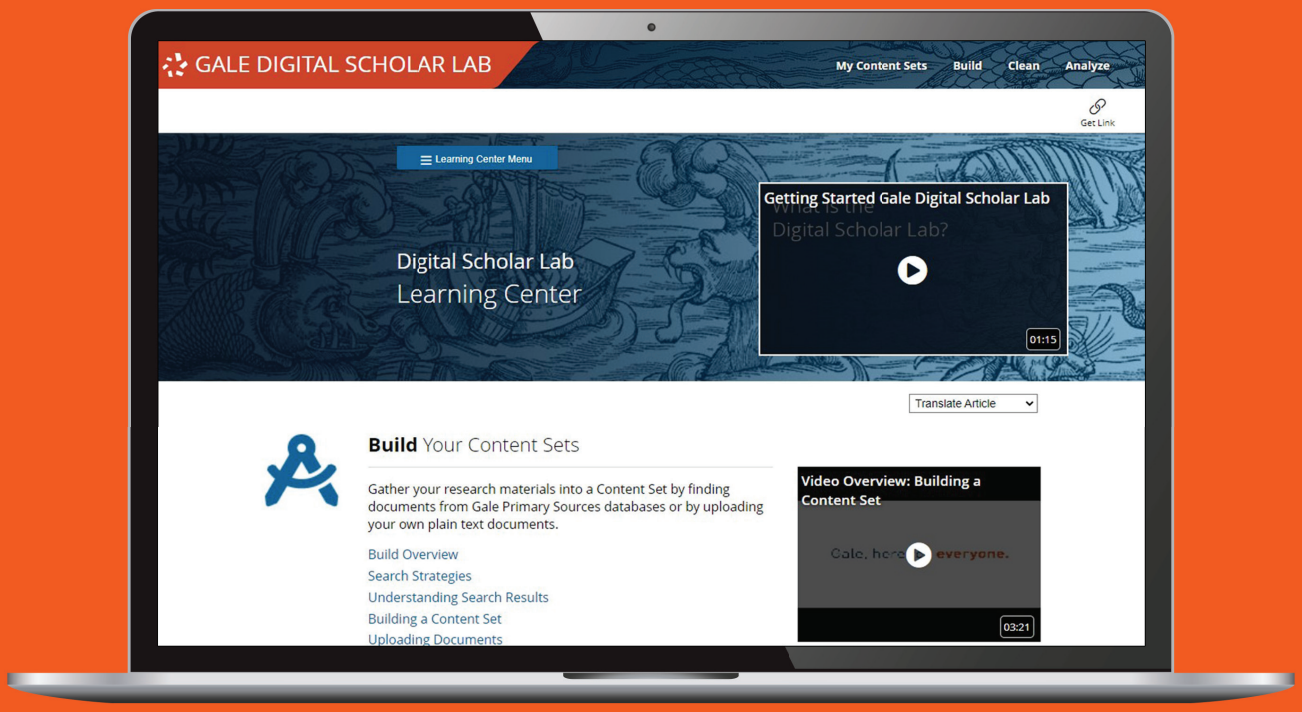
Seeing value in the *Lab* in an instructional environment, Weston added, "I also plan on bringing these tools into the classroom, and feel very comfortable developing lesson plans that teach students how to use the tools and identify which best suits their purposes and needs."

"My whole experience was very positive, and I will be recommending various tools to fellow researchers or students, based on their projects and individual needs," said Weston. "I can see all of the six different analysis tools being instrumental for shaping many different projects. Document Clustering would be useful for colleagues and students who are looking to scour the database for similar documents to ones they have already identified as useful or of interest. Topic Modeling would help researchers with a preexisting set of unstructured data that they would like to get a better sense of, finding words that commonly appear together across this dataset. Now that I am familiar with all of these tools, I am really looking forward to tailoring suggestions to future students."

> "I overall feel immensely ready to both teach these tools and also use them to tackle new projects and return to old ones with new insights and tools at my disposal."

GALE

Gale, here for **everyone.**



Get an Inside Look at Powerful Research Tools

Want to learn more about the resources Weston used to enhance her research and develop her digital humanities skill set?

Discover the possibilities of *Gale Digital Scholar Lab* at **gale.com/digital-scholar-lab**

Find more information about *Eighteenth Century Collections Online* (*ECCO*) at **gale.com/ECCO**

Interested in learning more about ASECS?

AMERICAN SOCIETY FOR 18TH-CENTURY STUDIES

Find more details about the American Society for Eighteenth-Century Studies (ASECS), including the society's initiatives and events, at **asecs.org**