

**PUBLIC WITNESS TESTIMONY**  
***Driving Innovation Through Federal Investments***  
**submitted to the United States Senate Committee on Appropriations**  
**by Dr. Bethany Nowviskie, President, Association for Computers and the Humanities**  
**and Director, Digital Research and Scholarship, University of Virginia Library**  
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Madam Chairwoman and Distinguished Members of the Committee:

I write to you as a scholar whose research was transformed and amplified by small but significant investments of federal funding through programs of the National Endowment for the Humanities (NEH), the Institute of Library and Museum Services (IMLS), and the Library of Congress. I also write as the director of a laboratory at the University of Virginia Library, where the next generation of humanities problem-solvers receives training in digital methods, thanks to an endowment begun 20 years ago with seed money from the NEH. Finally, I write as president of the US-based Association for Computers and the Humanities, the largest international professional organization for people from all fields and disciplines who apply technology to the study of history and culture, past and contemporary arts, and societal challenges we face today. ACH is an organization that understands the value of federal investment in innovation, and whose members' discoveries are made possible by your support for humanities research and public education.

In each of those roles, I have seen how federal funding for the humanities has led to: meaningful and widely-applicable innovations in technology; unexpected research results, including in fields beyond the liberal arts; stronger and more flexible cyber-infrastructure; local economic growth, including by sparking private investment; global engagement of students, scholars, and the general public; and the creation of new educational opportunities for American citizens, from primary and secondary schools through college and post-graduate work.

I am grateful for the opportunity to provide just a few examples of the ways federal investment—not only in STEM research, but also in vital fields of the humanities—drives innovation.

**As an individual digital humanities scholar**

I have seen federal investments:

- launch my own career. NEH funding to my academic mentor, Professor Jerome J. McGann of the American Academy of Arts and Sciences, helped support the creation of one of the earliest scholarly digital archives of art and literature (the *Rossetti Hypermedia Archive* at the University of Virginia). It also allowed him to hire me as a student assistant, where I not only learned to apply my literary training to research

questions in the digital age, but also grew in confidence and ability as a young woman working in humanities computing.

- help a little idea, conceived at the University of Virginia Library—for marrying maps with timelines in the context of a collection of Civil War manuscripts—grow from a tiny NEH/IMLS “Start-Up Grant” I was awarded in 2009, to a multi-year contract with the Library of Congress and partners at George Mason University, meant to advance the integration of digital archiving and preservation platforms with tools for scholarly interpretation. Our project, *Neatline*, is now a robust and popular open source tool, being applied to research (on topics as diverse as an analysis of early American nation-building through schoolgirls’ maps and the discovery of lost archaeological sites from ancient Greece by analyzing Homeric verse), to teaching (in courses at many institutions, covering the 8<sup>th</sup> century BC to the 21<sup>st</sup> century AD), for digital storytelling, and most recently even for medical X-ray annotation by cardiologists and pulmonologists in a collaboration between Boston University and James Madison University.
- make it possible for an “Advanced Topics in the Digital Humanities” institute to become a large-scale and highly meaningful exercise in building intellectual and technical infrastructure for geospatial research across American universities and public libraries, as 146 scholars, librarians, and technology staff competed to be among the research teams funded to receive training over the course of two years, and the opportunity to collaborate with each other at UVa. Countless software projects and works of scholarship have since spun out of this investment—an investment not made directly in technology, but in people. For me, hosting the Institute led to invitations to share our findings and approaches not only at a number of US-based conferences and institutions, but to offer leadership on “American-style” support for spatial research at the British Royal Academy and other international venues on three continents.

### **As the director of a library-based lab for experimental humanities**

I have seen federal investments:

- help create an endowment that has, since 2007, supported fellowships for 44 graduate students in the digital humanities at the University of Virginia, with 9 new fellows receiving their awards shortly. These are students interested in the deep integration of humanities research questions with new media and new technologies, and in broadening the career paths available to them as highly-educated and capable men and women. Matching funds from a 1990s NEH Challenge Grant helped us to motivate private donors, including Jeffrey C. Walker and the Walker family, to create our digital scholarship endowment. In other words, federal investment in the humanities led to private investment. Taken together, the public and private funds that have accrued in this endowment not only fund our junior scholars to receive

training and mentorship—they helped us to build the inspiring physical environment in which they do their work, the UVa Library Scholars' Lab.

- motivate local scholars in departments and research areas that have been slow to embrace interdisciplinary collaboration and the public humanities to begin to re-configure their own institutions and practices. Our faculty members respond to attractive chances to answer new questions, engage with new data, and receive the professional acknowledgment and necessary material support of a federal grant. They regularly use the opportunity of grant-funded research to break down disciplinary silos, create new curricula for their students, and develop tools and approaches that have gained unexpected users (from K-12 Spanish classes to local archaeological survey firms and software development start-ups) and that challenge inherited notions of the relation and obligations of the academy to the American public.

### **As the president of a digital humanities professional organization**

I have seen federal investments:

- prompt humanities and science agencies begin working together, and collaborating with their foreign counterparts, to promote interdisciplinary innovation. For example, the highly-successful, now regular *Digging into Data Challenge*, initiated by the Office of Digital Humanities at the National Endowment for the Humanities in 2009, brings together the US-based NEH, NSF, and IMLS agencies along with seven other international funders and a host of public data providers, to enable cutting-edge humanities research by globally-dispersed teams working with massive datasets.
- make possible, in direct and indirect ways, the finest peer-reviewed scholarly and technical work presented at our annual international conference, *Digital Humanities*, and published in the array of journals and online venues supported by the Alliance of Digital Humanities Organizations, of which ACH is a founding member. Without reliable federal investment in higher education generally, and specifically in the governmental agencies which make grants to scholars with bright ideas, less research would be done, fewer discoveries made, and only rarely would best practices be developed and shared.

When introducing a new piece of Apple technology at a March 2011 event, late tech innovator and entrepreneur Steve Jobs attributed his company's commercial and aesthetic success to the blending of what some call our two cultures: "Technology alone is not enough. It's technology married with liberal arts, married with the humanities that yields the results that make our hearts sing."

On a practical level, broad research-and-development investments in library science and the digital humanities have driven numerous advances in science, technology, and industry. Further examples include: the development of XML (Extensible Markup Language, a chief engine of the World Wide Web) and Dublin Core Metadata (a key standard for Linked Open Data discovery across disciplinary silos); advances in digital mapping and location-based tools for research, crisis response, and leisure; the development of new media and user interfaces, both on-screen and in augmented reality and wearable computing; and the building of open science and humanities cyber-infrastructure, or the creation of cross-disciplinary virtual research environments for information sharing and digital preservation.

Critical research advances are made, and innovation is driven in the United States, by creative and industrious people who can translate small investments our government makes in the many disciplines and professions of the sciences, engineering, medicine, the social sciences, humanities, and arts into major findings and outcomes with broad public benefits. The past several years have seen research-oriented funders and government agencies across all disciplines working more closely together (in part through the coordination of the White House Office of Science and Technology Policy), to ensure that the general public can easily access and build upon federally-funded research.

Humanities researchers and other innovators—and the agencies and organizations that allow them to take intellectual risks and that help to launch their projects—require judicious and reliable investment of federal dollars. They in turn need the robust and unwavering support of the Senate Appropriations Committee. I thank you for the faith shown in me and in the larger digital humanities community by federal entities such as NEH, the IMLS, and the Library of Congress, and for all the opportunities your past investments in these offices have made possible.

It is the nature of R&D to gamble—on good ideas and good people. Not every line of research results in immediate application, just as not every question asked is possible to answer. But we keep asking, and in the aggregate, federal investments in American innovation are a very good bet.