

## **THE IMPORTANCE OF THE COMPUTER SIMULATION ARCHIVE**

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### **ABSTRACT**

This paper discusses the importance, historical significance, and prestige of the Computer Simulation Archive (<https://d.lib.ncsu.edu/computer-simulation/>) at North Carolina State University Libraries, including its importance to the field of simulation and its place in the broader context of research library archival collections.

### **1 THE IMPORTANCE OF THE COMPUTER SIMULATION ARCHIVE**

Archives serve as living memory. They document the spectrum of human activity and achievement. Everything from Shakespeare's sonnets, to wars, to landing on the moon are documented in the archives of museums, governments, and libraries. Archives make that documentation available to those wanting to study the history of such achievement and, perhaps more importantly, those who want to understand human achievement to foster further advancement. Archives are by their nature a study of the past - of events, people, processes, and documents that have been. However, their purpose is very much rooted in the present and the future. Archives are a living memory. They drive further understanding and from the knowledge stored within them, nurture future advances. Archives tell stories. Stories ranging from the ancient past, to the middle ages, to modern history. Stories covering the breadth of human discovery and intellect, from the arts, to scientific discovery, to humanistic inquiry. Once preserved and documented, these stories are discovered through the interplay of archive and researcher. Told through a process of inquiry, discovery, and re-constitution - archives and their stories help unlock human knowledge. Done properly, they are an organic record that grows, becomes more discoverable, and comes to be used by more and more researchers over time. Established in 1998, the North Carolina State University (NCSU) Libraries' Computer Simulation Archive is an example of such a living, dynamic archive - <https://d.lib.ncsu.edu/computer-simulation/>.

In general, archives consist of records that have been selected for permanent or long-term preservation on grounds of their enduring cultural, historical, or evidentiary value. Archival records are almost always unique. The traditional mental model of archives consists of paper documents held in vaults and other secure locations within libraries and museums. Born in 1998 and documenting a technical field that emerged in the 20th century and continues into the 21st - the Computer Simulation Archive is quite different from that traditional model. It captures a more recent past, one that bridges from the paper to the digital age. Its unique documents contain everything from notebooks, to letters, to computer code, professional records in print and electronic form, to email, to books, to the living memory of the pioneers who developed and shaped simulation. The contents of the archive continue to grow as its pioneers contribute their records and audio- and video-recorded memories. The still growing, hybrid print/digital archive reveals two reasons why the Computer Simulation Archive is such an important effort.

For one, it allows the NCSU Libraries to document a field that is still evolving, and to work with some of its founders in gathering documentation to tell the story first-hand of how the field of simulation has developed. Rather than looking back into the distant past through specific perspectives and collections, the Computer Simulation Archive can be built in real-time, with the content coming directly from those who participated in its development and growth. The hybrid nature of a collection that includes print and digital files makes for broader discovery and enables users to access digital files across space and time. A recorded transcript of a video interview for example can produce thousands of lines of text that can be made available to search engines and mined for trends, observations, and themes. Finally, working directly with pioneers in a field enables us to collect what those directly involved describe as the most important people, events, and content. We do not have to guess, but can know directly what are the most important elements to add to the archive. Second, documenting a still evolving field enables us to understand how a field like simulation has expanded into and impacted other fields. The influence of simulation on academic disciplines, particularly those comprising the fields of computer science, manufacturing, and emerging areas such as gaming has been profound. Through a modern archive we can explore and help to document those connections and influences on other fields.

## **2 SUPPORT FROM THE SIMULATION COMMUNITY**

The NCSU Libraries' Computer Simulation Archive was established with substantial initial donations of papers and research materials by three pioneers in the field of computer simulation—Robert G. Sargent, A. Alan B. Pritsker, and Julian Reitman. Subsequent contributions from Richard E. Nance, James R. Wilson, Ingolf Ståhl, Bruce Schmeiser, and others helped to enhance the volume and importance of the collection. By working in real-time with founders of the field of simulation, the Libraries and its collaborators were able to work together to build an endowment for its ongoing use by future generations. The endowment supports the archive to facilitate the addition of more collections, expedite processing of materials in the collection, and enable the digitization of selected materials documenting the history of computer simulation. With the assistance of simulation scholars, relevant professional societies, Friends of the Library, and individual donors, the Computer Simulation Archive continues to develop, providing researchers with valuable insights into the history of the field. A rare characteristic of the Computer Simulation Archive is the level of deep engagement and support of the broader simulation community. That support has been instrumental in the development of the archival collection and the endowment to sustain it over time. Particularly rare has been the combination of individual supporters and a breadth of professional societies such as the Association for Computing Machinery/Special Interest Group on Modeling and Simulation (ACM/SIGSIM) and Institute for Operations Research and Management Sciences (INFORMS) Simulation Society (I-SIM). The broad support from the individuals and organizations is further outlined on the site (<https://d.lib.ncsu.edu/computer-simulation/about/>) and formally recognized on the “Giving” page for the Archive (<https://d.lib.ncsu.edu/computer-simulation/giving/>).

Another advantage of working to document a more recently developed field of research and scholarship is the ability to obtain oral histories, direct remembrances from the researchers who participated first-hand in the evolution of simulation. To help document the development and expansion of this field, the NCSU Libraries is pleased to present a unique corpus of video oral histories of computer simulation pioneers. The video oral histories of computer simulation pioneers, through financial support from the National Science Foundation (NSF), were conducted from 2013 to the present. The purpose of this grant initiative is to capture and preserve accounts of seminal projects, related pivotal events, and distinguished project contributors from the perspectives of, and the words of, individuals who witnessed the relevant history of computer simulation firsthand. The importance of collecting these accounts is based on the remarkable degree to which computer simulation has heavily influenced the design of computing software. These video oral histories build on the audio oral histories already present in the

Computer Simulation Archive. Working in real-time in a still-evolving field enables archivists to bring to bear the full suite of tools available to a 21<sup>st</sup> century research library.

- 1) Robust print archiving. The latest practices in acquiring, preserving, processing, and efficiently making print collections accessible to scholars.
- 2) Digital archiving, preservation, and mining of born-digital and scanned collections. Simulation is a field born-of and immersed in digital technologies and software, and requires still evolving methods of digital archiving to build and manage its documentary evidence.
- 3) Firsthand interviews with founders in the field of simulation, including digital video that we can capture, transcribe, and disseminate through open digital collections.

This powerful combination of tools is made possible through the well-established methods of archives, the power of digital discovery, and collaboration among archivists and researchers. Libraries and archives have only penetrated the surface of the ability to leverage this combination for archiving recently emerged fields of scholarship. The Computer Simulation Archive is an important foundational experiment in what can be done working in real-time with founding researchers – enhancing its importance as an archive of the history of simulation and its potential as a model for other collections.

### **3 BROADER CONTEXT**

In the Special Collections Research Center (SCRC) of the NCSU Libraries, we acquire and build unique collections that document historical and contemporary aspects of fields of study that are strengths for NCSU. The SCRC leads a program that supports research, teaching and learning with rich primary resources to support the mission and research of the university and the scholarly community at large. The collections include the University Archives; significant manuscript collections and faculty papers in all media including electronic and born-digital records and rare and unique books. The Department's Digital Program provides seamless access to digital resources that are used in the classroom and high tech Visualization Labs and by remote researchers. The Program supports the needs of NCSU's alumni and students through online access to resources such as student newspapers, class books, course schedules and other unique university publications. Special collections are essential elements in determining the unique value and relevance of research libraries. As mainstream published digital content has become more ubiquitously available, special collections increasingly make research library collections distinct. They signal a research libraries value to their own communities and within the broader ecosystem of research libraries and researchers.

Scholarly research depends ultimately on the availability of primary sources. Research libraries preserve and provide such primary resources as part of their fundamental mission. Manuscripts or printed books or other artifacts or objects "born-digital" are the footprints of prior cultures, scientific growth and development, and turning points in history. Research libraries view the commitment to primary resources as a critical component of our institutional mission and as an enduring contribution by research libraries to scholarship and learning. Special collections or archives include items precious through their rarity, monetary value, or their association with important figures or institutions in history, culture, politics, sciences, or the arts.

As the only such archive of its kind in existence, the Computer Simulation Archive makes the NCSU Libraries the singular destination for scholars studying the founding and evolution of the field and the disciplines, such as computer science and engineering, statistics, operations research, and manufacturing to name a few, that simulation touches. Current and future simulation researchers, historians of science and industry, scholars of the gaming industry, and fields we have yet to imagine will study the origins and development of simulation at the NCSU Libraries for generations to come. We embrace the opportunity to steward the history of simulation through primary resources that are vulnerable to destruction or disappearance without special treatment. The development, preservation, support, stewardship and dissemination of major special collections such as the Computer Simulation Archive thus becomes

hallmark of what defines a true research library, and an internationally recognized destination for scholars.

To help guide the development and growth of the Computer Simulation Archive, the NCSU Libraries has established an advisory committee comprised of Dr. Richard E. Nance, Dr. Robert G. Sargent, and Dr. James R. Wilson. The advisory group helps acquire new primary materials for the archive, advocates for the growth of the endowment, and advises the Libraries on priorities for stewarding the archival collections for use and access by scholars.

#### **4 SUMMARY**

The creation of the Computer Simulation Archive has been an unqualified success. The collections represent a dynamic, contemporary, and growing archive of one of the 20<sup>th</sup> and 21<sup>st</sup> century's most important fields in science and engineering. They provide unique documentation of the founding and development of simulation for generations of students and scholars from fields as diverse as industrial and systems engineering, to sociology, to game design and development, to the history of science and technology. The Simulation Archive also brings significant prestige to the NCSU Libraries. It provides an asset that contributes value to the SCRC in the Libraries with a collection of materials not available anywhere else in the world. The ability to partner with and interview the founding members of the field, along with the ongoing collaboration between the Libraries and the major simulation related professional organizations creates an infrastructure for ongoing growth, development, and sustainable funding.

#### **AUTHOR BIOGRAPHIES**

**GREGORY K. RASCHKE** is the Associate Director for Collections and Scholarly Communication at the NCSU Libraries where he leads programs to build, manage, and preserve the Libraries' extensive collections. His responsibilities include overseeing the special collections program and the development of digital collections. He has significant experience managing fundraising, annual giving, and naming opportunity campaigns. He leads the Libraries' partnerships in developing sustainable channels for scholarly communication and enhancing digitally enabled research and scholarship. Raschke also leads efforts to support faculty and graduate students with emerging tools, programs, and services across the research lifecycle. His email address is [gkraschk@ncsu.edu](mailto:gkraschk@ncsu.edu).

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