On August 10th, 1628 the Swedish warship Vasa set its sails for the first time, in Stockholm harbor. Its construction was personally commissioned by King of Sweden Gustav II Adolf and with its full complement of 64 cannon, the ship was the most powerful weapon in the world. After sailing less than one nautical mile, however, Vasa heeled precariously to port, plunging its lowest open gunports underwater. The massive warship filled with water and sank rapidly.

Research

Vasa remained on the bottom of Stockholm harbor for 333 years, until it was raised nearly intact in 1961. It remains the oldest intact vessel ever recovered. After more than two decades of conservation treatment, Vasa went on display in a purpose-built museum in 1990. The hull and its associated artifacts have been the focus of intense archaeological investigations since the time of its raising, yet many fundamental questions remain unanswered about the ship. Kelby Rose’s dissertation project seeks to answer one of these questions:

How was the hull of Vasa designed?

In the early 17th century, the Dutch were famed as the premier shipbuilders in Europe and employed in several countries outside of the Dutch Republic. Two Dutch master shipwrights, Henrik Hybertsson and Henrik Jacobsson, oversaw the design and construction of Vasa’s hull. Construction features of the hull confirm that the ship was built according to 17th-century Northern Dutch methods of naval architecture. This is particularly significant as Dutch shipwrights did not design their vessels on paper prior to construction – instead they designed their vessels by eye. It is certain, however, that a deliberate mental design method was used, just not committed to paper. Literary and archaeological sources indicate that these methods were guided by a small set of rules of thumb. These rules, however, were frequently broken and do not account for every aspect of a ship’s design. The experience and judgment of the shipwright filled in these gaps and allowed for complete design realization. Vasa presents archaeologists with an unprecedented opportunity to examine this process for an intact 17th-century vessel.

Using advanced digital 3D modeling technology, this dissertation project is virtually deconstructing the hull of Vasa to recover and analyze the underlying system of logic that explains its design.

This project is an important methodological step
forward for the practice of nautical archaeology. Using *SolidWorks* 3D modeling software, Kelby Rose is constructing precise models of the principal components of *Vasa*’s hull. Due to concerns about its structural integrity, the actual hull of *Vasa* cannot be fully disassembled. The digital models however can be fully manipulated and therefore enable a level of analysis and interpretation that is not possible with their physical counterparts. These models will serve as the basis for a detailed 3-dimensional examination of the naval architectural principles of *Vasa* and recovery of its design method. This process of recovering the design concept from the intact structure is termed “reverse naval architecture”. The highly visual nature of digital 3D models means that both the procedure and results of this project will be documented and disseminated in unparalleled clarity and detail.

The results of this dissertation project will not only answer fundamental questions about *Vasa* and the influential Dutch shipbuilding tradition during the birth of the Scientific Revolution, it will also contribute significantly to the array of analytical and visualization tools available to nautical archaeologists in the 21st century.

**Citation**