d'Arthur. All the figures—whose lives illustrate changes over time in chivalry and its geographical range—are the authors or subjects of a major textual work."They're active participants" in the chivalric world, he says.

As a historian, Kaeuper finds enormous value in literary texts. "I use a lot of miracle stories, as well as standard imaginative literature," he says. "They're important—because they are imaginative, because they show what people are worried about, what they're hoping for."

The title of his book is deliberate because Kaeuper wants to emphasize that what he is examining is medieval chivalry, not post-medieval chivalry or neo-Romantic chivalry. Describing his task as "cutting a path through the thickets of Romanticism," Kaeuper says that people in the 1800s in England and continental Europe, and to a lesser extent, the United States, looked back to the Middle Ages in a search for national identity and in an effort to escape problems of modernity.

"Far from dark," he writes, "the medieval past was not only colorful and fascinating, but too important and too useful to be ignored. The romantic revivers did not and perhaps could not recognize that they were altering the original drastically and investing it with meanings that would have surprised its first practitioners."

According to Kaeuper, the chivalric world resonates still—and he feels its power as it touches on issues of violence, religion, governance, and more.

"It's a scary subject, because it's so serious," he says. "The editor of one of my books wrote to me and said, 'This isn't just about the Middle Ages. This is a modern book.' That's not the goal. My goal is to understand the Middle Ages. But you can see how it applies.

"If you start thinking modern as you go into the past, you distort the past. If you start with the past and see if it informs the present, I think you're on the right path." —Kathleen McGarvey

The Inner Ear: A Beautiful Sensor

A Rochester engineer explores the biomechanics of a remarkable biological structure.

Nearly four decades ago, English researcher David Kemp discovered that the human inner ear not only receives but also generates sounds as part of its normal functioning.

The finding led to the standard method now used to screen hearing in newborns. But even now, scientists are not sure how or why these "otoacoustic emissions" occur.

Jong-Hoon Nam, assistant professor of mechanical engineering and of biomedical engineering, hopes to provide answers to that and other mysteries of the incredibly complex sense of hearing. His lab is combining computer simulations with a novel microfluidic chamber to focus specifically on the organ of Corti. The organ—a complex, truss-like strip consisting of inner and outer hair cells, a basilar membrane and supporting cells—plays a key role in converting sound-generated oscillations in the cochlea's fluid-filled chambers into electrical signals that go to the brain.

"The biomechanics of the organ of Corti have been under-investigated," he says. "We would like to know how the complicated structure of the organ of Corti contributes to the overall function of the cochlea."

With support from an NIH grant that could total $1.8 million over the next five years, Nam hopes to lay groundwork that could eventually lead to better hearing aids or more finely customizable implants. Because the inner ear can process a wide range of both frequencies and loudness, understanding its processes might lead to more sensitive pressure transducers and other engineering applications. "Engineers continually obtain ideas from biological systems," Nam says. "And the inner ear is a beautiful sensor, operating over a remarkably wide range."

Nam and his lab will employ novel experimental and computational approaches, including the development of a microfluidic chamber that imitates the physiological conditions of the cochlea. That's designed to help "address the pivotal question in cochlear research—how outer hair cells, the cochlear amplifier, work within the organ of Corti."

Nam's team is also developing a computational model that incorporates the physical, electrical, and fluid mechanical properties of the organ of Corti and the entire cochlea. Members of the group are developing the computer codes themselves because no commercial program provides an easier way to solve such problems.

Nam notes that much of the historical research on the inner ear has occurred at two extremes of scale: the macro biophysics of the cochlea as a whole, and the physiology of individual cells and molecules. By focusing on the multicellular physics of the organ of Corti, and the electromechanical interaction between outer hair cells and the microstructures around them, Nam hopes to "bridge" previous findings and provide a "new integrative paradigm of hearing research."

—Bob Marcotte

HEAR, HEAR: Ibrahim Mohammad '17—a Xerox Engineering Research Fellow in the lab of Douglas Kelley, assistant professor of mechanical engineering—built and tested a laboratory model to simulate the movements of the inner ear's hair cells in support of Jong-Hoon Nam's project.

ADAM FENSTER