Once upon a time, the famous fifth-century B.C. artist, Zeuxis, wanted to paint a pair of galloping steeds. He spent years studying every technique of painting, every kind of brush stroke, every possible mixture of color and shadow. He studied the anatomy of the horse and its every movement. Somehow, no matter how much he essayed, the painting never came alive. One day, in a fit of bitter disappointment, he hurled his sponge at the painting. The accidental smudges and whirls magically made the horses appear to fly across the canvas. His painting was celebrated as an inspired work of genius.

For centuries, philosophers have used this tale to ask questions of the nature of art. Can art perfectly imitate nature? What is inspiration? Is inspiration a chance occurrence or the result of great effort or great passion? To what extent does good art depend on science and good science on art?

This issue of Quest addresses these questions and more! Lisa Drake and Martina Doblin, inspired by the beauty of science and nature, have not only built it into a curriculum for the schools but also into a beautiful exhibit which many viewers perceive initially as modern art.

Gary Edgerton analyzes filmmaker Ken Burns’ work, demonstrating the science and the history present in what some might consider the popular art of successful television documentaries.

Phil Raisor, in a memoir, itself an artistic delight, deals with the art of sports, the science of a well-executed play and the sociology of the tension in the basketball arena in a racially divided society.

Cynthia Jones, co-winner of the Virginia Scientist of the Year award in 2003, is inspired by the beauty of science and the quest for truth. She recently stepped outside her laboratory to join Governor Warner’s Virginia Marine Resources Commission. As the first fisheries scientist on the commission, she has an opportunity to apply her findings to foster a balance between recreational and commercial fishing. Her work, both in its purely scientific form and its applications, ensures us continued enjoyment of the natural beauty that surrounds us.

While one might not immediately consider a complex computer program that provides access in a logical and orderly fashion to the knowledge of centuries as art, it is certainly a work of beauty. It contains the classical principles of design and balance and has been painstakingly constructed like an extremely complex edifice. Kurt Maly and Mohammad Zubair have been doing cutting-edge research to develop novel digital library services. Internationally recognized for their work on the fundamental architectural aspects of digital libraries, they have collaborated with researchers from across the country to provide information around the world.

The French poet Jean de La Fontaine declared that diversity was his motto. Faculty at the Old Dominion University College of Health Sciences may not have read La Fontaine, but they have adopted his motto. For example, they translated their community health materials into Chinese and studied Spanish in an effort to communicate with the multicultural world in which they work. Laurel Garzon’s $533,000 federal grant will help the College train healthcare providers to address this diversity. The art of inclusiveness involves the art of understanding, of communicating, of finding the universal while remembering and respecting individual differences. The works of the diverse poet La Fontaine are considered classics today. The work of the College of Health Sciences is today a class act and will, in the future, be considered a cornerstone of health care, which is both an art and a science.

If science and nature are one to the philosopher who distinguishes them from myth and fiction, and if art is only nature operating with the aid of the instruments she herself has wrought (dixit Paul-Henri Thiry, Baron d’Holbach, the 18th century French philosopher), then we might well conclude that science and art, both representing the most refined flowering of the human mind and spirit, are synonymous. Now, if one were a true logician, one would quickly discern the flaw in the proposed tautology, and thus I request you to accept and follow the dictum proposed by William James (brother of the American novelist): “The art of being wise is knowing what to overlook.”

Yet science and art both rely on inspiration. Both emanate from nature and are conditioned by culture. Both require study and discipline. Old Dominion University faculty members excel at both. They make of science an art and of art, a science. It is no wonder that they are good teachers as well as outstanding researchers.

Roseann Runte
President
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ON THE COVER
The "exploding star" beauty of an anemone, a relative of the jellyfish, is highlighted by its host, a decaying piece of the seagrass Zostera marina. The photomicrograph of seagrass samples collected from the York River was taken by ODU researcher Lisa Drake.

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Fish Tales

FISHERIES EXPERTISE LEADS TO SCIENTIST’S APPOINTMENT

BY ELIZABETH O. COOPER
From flourishing striped bass populations to declining oyster and blue crab harvests, Virginia’s fisheries represent a mixed bag with the potential to influence the state’s economy over the next generation.

“We want to keep the fish population healthy for the grandchildren of all Virginians so that they will have fresh seafood and a vibrant economy around the bay,” says Cynthia Jones, professor of biological sciences and a member of the Virginia Marine Resources Commission. Governor Mark Warner appointed Jones to serve on the commission in 2002, making her the first fisheries scientist to join the board formed in 1875.

After spending several decades investigating the data found in fish ear bones (formally known as otoliths), as well as other academic pursuits, Jones has eagerly parlayed her knowledge to protect and enhance Virginia’s marine industries. She joined the commission without a set agenda, only a desire to introduce ideas about population dynamics and modeling without an abundance of mathematical and scientific jargon. “I take the very rigorous scientific training I have and translate that into management decisions that scientists make,” she adds.

Jones’ scientific background and expertise about the Chesapeake Bay have given her insights into many of the issues currently facing the commission. Her work with fish ear bones, which she started in the late 1970s, led her into pioneering research using rings present in the structures to track the age, origins, growth and longevity of fish. “The underlying purpose of otoliths is to estimate the vital rates of the population and project what will happen with the population coming into the bay,” she explains. “If they’re coming from other states like North Carolina or New Jersey, it’s important that they manage their resources well. Virginia could be doing a good job, but if there will be problems if other states aren’t doing the same.”
Recreational Fishing Adds to State's Coffers

That potential exists for striped bass, which is enjoying a resurgence in Virginia. “The striped bass have rebounded, and landings are way up because of good management and environmental changes and a moratorium on striped bass fishing for a few years. But many of those fish are migrants, so that affects not only Virginia but other coastal states as well,” Jones says.

Along with striped bass, croaker, spot and black drum are also doing well, leading to a profitable recreational fishing industry. “Recreational fishing is important to the bay and is a big source of Virginia’s tourism income,” Jones notes.

While these fish are on the upswing, the bluefish population is diminishing. Jones and her colleagues have been trying to determine the reason behind the decline, but have yet to uncover anything concrete. “If we could answer that question, it would truly win the prize.”

Her latest research looks into the health of seagrass and ecosystems and their influence on fish. “We can now tie fish to the environment directly and see the consequences a year or two later because they carry the mark of the specific seagrass throughout their lives,” Jones says. “We’re the first ones looking at this in the Chesapeake Bay and pioneering it around the world.”

Balancing Needs of Commercial and Recreational Fisheries

Jones’ research has proven especially valuable as the commission examines habitat usage to develop a balance acceptable to both recreational and commercial fishermen. “We want to improve habitat degradation, but the commercial and recreational people are in conflict over the share of these resources,” Jones notes. “To me it looks like a struggle over an ever-diminishing pie. I would rather see the focus on restoring the lost habitat so there are more fish for everybody. When the population is more abundant, you can withstand environmental conditions better; but when you start having marginal habitats, the marginal population there can’t withstand natural phenomena.”

Much of this loss can be traced to the construction and agricultural runoff that has mushroomed along the coast. “The Virginia waterfront used to be trees and tidal marshes down to the ocean,” Jones notes. “Now there is construction and agricultural runoff. That and over-fishing combine to create too much stress.”

Habitat loss and over-fishing have nearly wiped out the state’s oyster and blue crab populations. “Virginia used to have prime oyster and blue crab fisheries, but now they’re in awful states,” Jones notes. “Oysters are at 1 percent of their original abundance, and we may see the loss of the Virginia oyster from the Chesapeake Bay.”

One proposal currently before the commission advocates introducing the Asian oyster to replenish the Virginia oyster. Jones, however, opposes this remedy. “I’m always concerned with bringing in non-natural species. It could destroy the population.”

To protect and augment habitats, the commission has instituted transferable fishing quotas for commercial fisheries, but Jones is concerned about the fairness of these rations. “The question is: how do you essentially privatize a fishery and do it fairly where it’s a public trust so that you meet the obligation to all Virginians?”

Even people who do not live along the coast or own a rod and reel are affected by fisheries industries, Jones asserts, adding that each resident of the state has a stake in what transpires in the Chesapeake Bay and the surrounding waters. “Every single Virginian owns Virginia’s portion of the Chesapeake Bay,” she says. “The farmer in Blacksburg is an owner as much as the waterman from Chincoteague. We are trying to use the resources to benefit all Virginians, not just one group.”

Watermen, as well as farmers and other groups, have been impacted by menhaden, a small fish that is inedible for humans but is prey for many other species of fish. Menhaden also act as filter feeders, scooping up massive amounts of water and consuming both phytoplankton and zooplankton, which in turn, leads to cleaner water. It is also used to produce fish oil and fish meal for livestock, providing a high-protein blend of nutrients that improve growth rates.

“It is an important industry for some areas of Virginia,” Jones says, adding that it is on the decline in other areas along the East Coast. “The recreational angling community would rather see that fishery barred so that menhaden is available as a prey item and not taken by humans.”

However, for many watermen and recreational fishermen, menhaden is not the biggest fish story. The snakehead fish, a carnivorous alien fish with an insatiable appetite and the ability to slither short distances on land, has recently been found in waters in several U.S. states, including Maryland. Although none of these fish have been discovered in Virginia waters, Jones says the state is not immune to the unwelcome guests. “All coastal states need to be concerned about invasive species brought in through ballast water. It could happen anywhere.”
From Boredom to Outstanding Virginia Scientist

Jones’ appointment to the commission is not her only recent accolade. Last year, she was one of two researchers honored with the Outstanding Virginia Scientist Award, in recognition of her pioneering work in fisheries ecology. Jones is the second woman and the first scientist in the field of natural resources and fish to receive the award.

“I did not expect it at all,” she says. “It gives me validation. Fisheries is very rewarding work. It can tie the very pure science together with applied science and you can see an immediate value to your work because the research can be used for management decisions.”

Monitoring fish populations is a major leap for someone who, despite having a love of science, was not encouraged to pursue a career in the profession. “I grew up in a time when women weren’t expected to be research scientists. I was in a teaching program, but one of my biology professors saw that I was bored and asked me to help him in his lab. It was fantastic. It taught me that to be a successful scientist, I was going to have to be interdisciplinary.”

After attaining her degree in zoology from Boston University, Jones enrolled in the graduate school of oceanography at the University of Rhode Island, where she received less than a warm welcome. “I was only the third woman in the oceanography program and initially couldn’t go out on research vessels.”

After completing her master’s degree, Jones worked for a consulting company where she realized that math and quantitative skills are invaluable tools for understanding the world. That led her to return to Rhode Island for her doctorate, with the goal of entering the fisheries industry. “In those days, fisheries was among the most mathematical.”

Today, fisheries as a specialty area within biology is slowly growing at Old Dominion, with about 20 undergraduate and graduate students assisting in research at the university’s Center for Quantitative Fisheries Ecology, which Jones heads. "Fishery science is very demanding to do well, but this work is likely to impact science in Virginia," she says. "Persistence is probably more important than brilliance. Having a love for it helps because just loving it deep down inside is going to get you through all the difficult times.”

“Virginia used to have prime oyster and blue crab fisheries, but now they’re in awful states. Oysters are at 1 percent of their original abundance, and we may see the loss of the Virginia oyster from the Chesapeake Bay.”

– Cynthia Jones
Ken Burns laughs now about the apprehension he felt on Sept. 23, 1990, the day "The Civil War" premiered on prime-time television and changed his life forever. He had just completed a two-month promotional tour, a grueling process at which he is particularly adept, being a highly quotable and charismatic speaker and storyteller. He checked out of his midtown Manhattan hotel on that Sunday morning and began the long drive back to his home in Walpole, N.H.

Suddenly seized with misgivings, he remembers thinking long and hard about the remarks of several reviewers who predicted that "The Civil War" would be "eaten alive," going head-to-head with major network programming over five consecutive nights. That evening, he and his family were "completely unprepared for what was going to happen" next. The first episode attracted an astonishing 14 million viewers, while the full program reached nearly 40 million people by Thursday, the largest audience ever for a public television series. As Burns reminisced in one of our interviews together, "I was flabbergasted! I still sort of pinch myself about it. It's one of the rare instances in which something helped stitch the country together, however briefly, and the fact that I had a part in that is just tremendously satisfying."

So much about Burns’ career defies the conventional wisdom. He became one of public television’s busiest and most celebrated producers during the 1980s, a decade when the historical documentary held little interest for most American TV viewers. He operates his own independent company, Florentine Films, in a small New England village more than four hours north of New York City, hardly a crossroads in the highly competitive and often-insular world of corporately funded, Public Broadcasting Service-sponsored productions. His 17 major specials so far—

**Who Owns History?**

Ken Burns is an admittedly controversial figure in historical circles. He has single-mindedly pursued his dual obsession with filmmaking and history for more than a quarter-century now, anticipating a much broader surge of interest in all things historical among the general population. During this time, Burns has emerged as the signature figure for a much larger trend in historical programming, primarily because of the unprecedented success of “The Civil War” as well as the consistently robust showings of his other television specials. He likewise has become a lightning rod for professional historians to express a spectrum of pro and con reactions about the growing popularity of films and television programs about the past, overshadowing the one-time preeminence of written histories alone.

Burns’ position as a historical documentarian essentially straddles two well-established and typically distinct professions. He is a highly accomplished television producer-director, and as he often characterizes himself, “an amateur historian” with a wide-ranging interest in American history but no special scholarly training or specialization in any particular area. His work habits, nevertheless, do have a great deal in common with many standard academic practices. His preparation for each historical documentary includes the disciplined rigor of thoroughly researching his subject, writing grant proposals, collaborating and debating with an assortment of scholarly advisers, composing multiple drafts of the offscreen narration, and gathering and selecting the background readings and the expert commentaries. The final, 372-page script for “The Civil War,” for instance, was its 15th version.

Burns is, accordingly, an able if “self-taught” historian, but he is not a professional historian. In contemporary America, the term professional suggests a person who has made a lifetime commitment to a specialized career and, thus, belongs to an exclusive and highly select group. A professional historian, in this way, is a scholar who belongs to the academy. An amateur, in contemporary terms and by contrast, is not to be taken all that seriously; he or she is considered a beginner, a dabbler, or in the worst-case scenario, a dilettante. “I just wanted to say that I wasn’t a historian in
the traditional, professional sense,” admits Burns, “and I think it may have been a little insulation or armor that would protect me.” In today’s parlance, he is more precisely a popular historian rather than an amateur, who uses the power and influence of film to reach well beyond a scholarly audience with his television histories.

Finding a Place for Popular History Alongside Professional History

The mutual skepticism that sometimes surfaces between popular and professional historians is understandable and unfortunate. Each usually works with different media (although some scholars do produce historical TV programs, videos and films); each tends to place a dissimilar stress on the respective roles of storytelling vs. analysis in relaying history; and each tailors a version of the past that is designed for disparate—though overlapping—kinds of audiences. These distinctions are real enough. Still, the artist and the scholar, the popular and professional historian, can complement each other more than is sometimes evident in the expressions of suspicion, defensiveness and even on occasion, scorn, that too often arise on both sides.

Professional history typically rejects the mythmaking of popular history. This tradition, which dates back to the second half of the 19th century, recasts the study of history inside the larger framework of scientific inquiry with an allegiance to objectivity (albeit modified these days), a systematic and detached method of investigation and the pursuit of new knowledge. The much older legacy of popular history, in contrast, is far more artistic and ceremonial in approach. It is usually consensus-oriented, narrative and biographical in structure, and intended to link producers and audiences in a mainly affirming relationship based on the immediate experience they share together around the characters and events of their cultural past. Most surprising today, the highest-profile examples of popular history in America originate on prime-time television, and many of these made-for-TV histories eventually find their way into the country’s classrooms as tools to help stimulate learning. Burns’ work, in particular, can serve as a useful point of departure for further analysis and debate about the subjects he covers.

I currently teach a class on “Television Histories as Collective Memory,” where my students and I are discovering how and why so many TV producers recreate prime-time history—disguised as entertainment—to clarify the present and imagine the future. For example, Burns designed “The Civil War” as a kind of delivery vehicle to explore our national legacies of race and prejudice, the changing roles of women and men in
society, big government vs. local control, and the personal struggle for meaning and conviction in contemporary life. My "Television Histories" class begins with the basic assumption that TV is the principal means by which most people learn about history today. Just as television has profoundly affected and altered every aspect of contemporary life—from the family to education, government, business and religion—the medium's nonfictional and fictional portrayals have similarly transformed the way millions of viewers think about historical figures and events.

Ken Burns, for instance, is arguably the most recognizable and influential historian of his generation, even though he isn't a traditional scholar. He reverses the usual academic hierarchy, trusting first the lessons found in art (photographs, film clips, period music, paintings, etc.) before turning to the scholarly record to fill in the details of his vision of American history. His is undoubtedly a speculative approach; but then again, filmmakers, professional historians and viewers like you and I are all amateurs when it comes to detecting the human traces of lives once lived among the emotional resonances of the past.

Burns, overall, articulates a version of the country's past that conveys his own perspective as a popular historian, intermingling many widely held assumptions about the character of America and its liberal-pluralist aspirations. Like other documentarians of his generation, he, too, addresses matters of race, gender, class and regional division. Unlike many of his contemporaries, however, he presents an image of the United States eventually pulling together despite its many chronic differences rather than a society coming apart at the seams.

Exploring the past is Burns' way of reassembling an imagined future from a fragmented present. "The Civil War," in particular, reaffirmed for the members of its principal audience (which skewed white, male, 35 to 49 and upscale in the ratings) the relevance of their past in an era of unprecedented multicultural redefinition. This aesthetic reintegration of the past into the present is one of the central purposes of popular history. For Burns, it is a process of reevaluating the country's historical legacy and reconfirming it from a wholly new generational outlook.

As historian Barbara Fields reminds us in the final episode of the series, "The Civil War is in the present as well as the past." In this one sense, at least, all history is contemporary. We can never escape our own time or set of ideological predispositions; and within this context, no one has ever before drawn more Americans to history through the power and reach of prime-time television than Ken Burns.
WHAT BEGAN AS A SIMPLE INVITATION TO A COCKTAIL PARTY TRIGGERED AN IDEA THAT MAY WIND UP INCREASING ELEMENTARY AND SECONDARY SCHOOL STUDENTS’ AWARENESS OF HOW ART AND SCIENCE ARE INTERTWINED. THAT HAS BECOME THE GOAL OF A TEAM OF OLD DOMINION UNIVERSITY FACULTY MEMBERS WHO ARE BETTING THAT THE PHOTOGENIC ATTRIBUTES OF PLANKTON, MICROALGAE, SEAGRASS AND SEA SLUGS WILL MAKE THEIR WAY INTO AN “ART IN SCIENCE” CURRICULUM STARTING IN VIRGINIA AND EVENTUALLY MAKING ITS WAY ACROSS THE NATION.
Old Dominion’s “art in science” project began in 2000 when Martina Doblin received an invitation to a cocktail party hosted by Lisa Drake, her colleague in the Ocean, Earth and Atmospheric Sciences Department. Doblin was immediately struck by the jewel-like image of a phytoplankton from Norfolk’s Lafayette River that adorned the invitation. Along with her R.S.V.P., Doblin suggested pooling their resources of marine organisms to form an artistic venture. “When I got the invitation, I realized we could do something with this imagery,” the Australian native recalls, adding that her graduate school adviser had often presented scanning electron micrograph images of plankton. Doblin, whose research focuses on the microbial ecology of ships’ ballast water, the ecology of harmful algal blooms and the food web effects of agricultural pollution, has photographed plankton from the Elizabeth River and the Chesapeake Bay, as well as salt crystals, and contributed those images to the project.

The two research assistant professors began delving into Drake’s collection of vivid images of marine plankton, gathered in her investigations of invasions biology of marine microorganisms, microbial ecology and interactions among seagrasses and the organisms that grow upon them. Drake photographed the plankton, found in Hampton Roads waterways, the Bahamas, and California’s Monterey Bay, with a digital camera attached to a microscope. The images, known as photomicrographs, are frequently set against colored backgrounds. The color is attained using a set of prisms and filters on the microscope that are arranged to achieve Nomarski Differential Interference Contrast, an optical technique that uses light instead of biological stain to distinguish different components of specimens. As a result, images can be seen in striking color, as well as in exaggerated three dimensions. The plankton ranges from simple rodlike shapes to complex, winding chains of star-shaped cells, adding to the artfulness of the images.

To further weave art and science together, Drake and Doblin joined forces with Robert Wojtowicz, chair of the art department, and B. Stephen Carpenter II, a former Old Dominion professor of art. Initially, they discussed compiling a coffee-table book of the images, but it soon became clear that the project had a broader impact. The venture took off when the framed, colorful images of the marine organisms were placed on display on the Old Dominion campus, followed by exhibits at Nauticus Maritime Center in Norfolk, the Virginia Marine Science Museum in Virginia Beach and Virginia Beach’s Contemporary Art Center. Along the way, Lisa Murray, director of corporate and foundation relations in the university’s Office of Development, secured a grant from the ODU Research Foundation to print note cards, each featuring a different image of the microscopic organisms.

Art and Science Enter the Classroom

The science and art faculty members, however, realized that their project could have ramifications far greater than an exhibit. Carpenter teamed up with Wendy Frazier, assistant professor of science education, and with input from the group, developed an “art in science” curriculum using the photomicrographs to teach the concepts of visual art and life science in a way that would spark students’ imagination. The Old Dominion team presented the curriculum during a 2003 workshop with staff at Norfolk’s Larchmont and St. Helena elementary schools, resulting in constructive comments from both art and science teachers.
“We think these are good tools for education,” Drake says. “The feedback from teachers has been positive and helpful to us in refining our ideas.” Frazier and Carpenter based the curriculum on the 5E model of education (Trowbridge et al., 2000): engagement to excite students in what they are learning; exploration to delve into the images; explanation to make sense of what they have seen; elaboration to apply the concepts and their experiences during the previous phases; and evaluation to assess the students’ understanding. To be widely used in Virginia schools, the “art in science” curriculum must be shown to address the state’s Standards of Learning in science and art objectives.

As part of an effort to promote “art in science” outside Virginia, Carpenter recently presented the curriculum at an international symposium in Qatar, as well as to students at a private school there. Frazier and the team plan to present the curriculum at an upcoming conference of the National Science Teachers Association. She believes teachers throughout the nation will gravitate to the project as they seek new ways to trigger student interest in science.

“National Science Teachers Association standards call for curricula that are more inclusive of the children’s backgrounds and interests,” Frazier says. “This curriculum is based on the work of female scientists and helps unite art education and science education. Both disciplines are based on observation and experimentation. The main message of both artists and scientists is that we use evidence in multiple ways.”

One of the curriculum’s activities calls for students to organize pictures according to different and similar characteristics, such as whether the organism captured in the microphotograph is living and whether it is simple or complex. Students also learn about the objects pictured and see how scientists can magnify objects to make them appear hundreds of times larger than their actual size.

“It’s a hands-on inquiry approach to capture students’ interests and draw more students into science,” Frazier says.

The Old Dominion faculty members are also trying to determine which content area in science to target for implementing the curriculum. It was initially designed to be placed in biology and earth science courses but can be expanded to include other scientific disciplines.

With younger students, the art side appears to hold more appeal. Lisa Murray says “art in science” has many applications for art classes, where students can explore the aesthetics of the marine organisms, compare the images with paintings and determine if their own drawings are art. “The long-term vision includes having a summer art camp at Old Dominion to immerse students in art and science,” Murray says, adding that students would also board the university’s research vessel, the R/V Fay Slover, to collect specimens in the Chesapeake Bay for their own photomicrographs.

A New Way to Display Marine Organisms

The plankton, algae and other marine creatures set against vivid colors have intrigued students in Norfolk Public Schools, where “art in science” has been presented as a pilot project. Many youngsters have been surprised to learn that the artful pictures are of objects found in local waters. Doblin and Drake are quick to point out that they do not manipulate the organisms or the colors on the slide to obtain the perfect image. They simply choose a color within the macro-
scope prism's color spectrum based on what will best accentuate the organism they are viewing.

“These colors are what we see under the microscope, using the particular optics the microscope has,” Doblin explains. “We’re not gluing specimens on microscope slides and making things happen. Scientists are in the business of unambiguous documentation. However, we’re presenting these organisms in a new way.”

She adds that some specimens are asymmetrical or appear to be floating when they are placed under the microscope. “The choices I make are what amuse me and what we think are aesthetically appealing.”

Drake notes that creating these images is not necessarily an easy task. In addition to collecting the samples, she must ensure the organism she photographs meets both scientific and aesthetic qualifications. “I may collect one pleasing image after a couple hours of work. My first criterion is that the technical aspects must be correct, then the art. If an image is cluttered by bacteria cells, that will mar the composition.”

Interestingly, Drake and Doblin are carrying on a centuries-old tradition of the intermingling of art and science. “There are some prominent examples in science where scientists created books of art using marine organisms,” Doblin says. For example, Doblin’s graduate adviser, Gustaaf Hallegraeff, is the author of a book of photomicrographs called “Plankton: A Microscopic World,” published in 1988. In an historical context, botanical drawings have been used as art for centuries. Organizations, such as Art and Science Collaborators Inc. (www.asci.org), specialize in raising public awareness about artists and scientists who use science and technology to explore new forms of creative expression.

“This has been going on for as long as science has existed,” Doblin adds. “But this is our version.”

Fourteen of the art in science images are currently on display at Nauticus: The National Maritime Center, in Norfolk, Va. Notecards featuring the images are available at the Old Dominion University bookstore.

“We think these are good tools for education. The feedback from teachers has been positive and helpful to us in refining our ideas.”

– Lisa Drake

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“We think these are good tools for education. The feedback from teachers has been positive and helpful to us in refining our ideas.”

– Lisa Drake
I did not write the memoir *Outside Shooter* out of a deep emotional need or a sappy talk-show urge to be confessional. I had no dysfunctional family, suicides, obesity or gun-runners to write about. I had no scores to settle.

But I had always been fascinated by personal stories, especially of an Ernest Hemingway or Malcolm X or Joan of Arc and the lives that crossed the pages of Mark Twain’s *Roughing It* or Robert Graves’ *Goodbye to All That*. Recently, I’ve jumped on Frank McCourt’s *Angela’s Ashes*, Mary Karr’s *The Liar’s Club* and my colleague Michael Pearson’s *A Boyhood in the Bronx*. In those stories, I’ve zeroed in on the changes in people’s lives, and the effect those changes had on me. I knew, for example, when I read W. D. Snodgrass’ *Autobiographical Sketches* the other day, I would never read his collection of poems, *Heart’s Needle*, the way I always had. His personal life had become art, and his poems had become more personal.

I’m not saying I love to go to parties and have strangers tell me their life stories, but the literary voice is not the slurred speech of a late-night rummy. In literature, deft arrangement, selected details, pace and delicious surprises draw us into lives that become increasingly meaningful as action and thought lead us deeper into their motives. At times, because I know them better, I feel closer to King Lear, Madame Bovary or Huck Finn than I do colleagues and friends. The techniques of fiction, non-fiction, drama and poetry are all designed to draw us into experience and hold us there until we see or feel more deeply than we did.
David vs. Goliath

So why did I write the memoir? Here's where the story gets really personal.

I once played in a state championship basketball game in Indiana in 1954 that later inspired two Indiana natives to write and produce the movie "Hoosiers" in 1986. The small-town team beats the big-town behemoths on a last-second jump shot. Even today, an older generation of Hoosiers can still remember where they were on the night tiny Milan beat towering Muncie Central, and as we arrive at the 50th anniversary of that game in March 2004, the myth-mill grinds on. I am a part of that myth, but as one of the "bad guys" who got his comeuppance.

Long ago I put that game behind me, until the movie came out. Then the questions, sometimes in a phone call from California, began. "What was it like being on the losing team?" "Was the game really like that?" "Was the Milan coach like Gene Hackman played him?" I couldn't remember. I made up stories.

Most movies have a short shelf life, but "Hoosiers" recycles monthly on TV it seems, so the questions continued. In 1993, I was even invited back to Indiana, where the governor gave both the Milan and Muncie players Indiana's highest service award, the Saginaw of the Wabash. My father was in public education for more than 50 years, and truly deserved one. I got mine for being on a losing basketball team. Perhaps it was then, out of this sense of irony and unfairness, that I began to review "The Game" and my life in the 1950s in Muncie, Ind.

At Old Dominion University, I have taught memoirs and the craft of writing in my classes for years, but I had not thought of applying my scholarly knowledge to my own life. As soon as I did, I realized I was already seeing my growing up from several different angles. From boxes I pulled letters, photographs, ticket stubs, faded ribbons, unfinished journals and school papers. Juanita, my wife and high school sweetheart, had her own collection of pressed flowers, mysterious notes and class texts. My greatest find was my mother's scrapbooks which she had diligently kept through the years that my brother and I played for the Muncie Bearcats (He won two state championships!). Then there were my family's reminiscences, hours in library archives, and friends' and bystanders' different versions of history.

Although the research was conventional enough, I kept shaping a narrative that changed not only with the evidence, but also with my feelings about the evidence. This was new. When working on the fiction of James Joyce or William Faulkner for an article, I would be persistently objective. Now, a game lost to Kokomo or a journalist's cutting remark would test me. Did I want that in or out? Not, "Should that be in or out?" But, did I want it in or out? Before long I realized I would destroy my story unless I decided on the goal of the memoir, and then let that goal determine the content of the book. Once done, I became simply another character in a plot.

I embraced that idea, but tempered it as well. Total objectivity is not possible, and my goal was to portray living in the late '50s and early '60s when profound cultural change was beginning to surface on the American landscape. I knew from my first conception that the book would include a heavy dose of basketball, but that I would use it as Hemingway used bullfighting in "The Sun Also Rises" and the movie "The Turning Point" used ballet as a dramatic center for discovery of both self and society. My coming-of-age story would include my version of the Milan/Muncie game, but only as the springboard for becoming aware of losses all around me.

But trouble lay ahead. Central characters John Casterlow and coaches Jay McCreary and Dick Harp had died. I couldn't get their stories. Juanita and close friends Fred Scott and Mick Keppler didn't remember some of the events the way I did. Stores, landmarks, train routes and whole downtowns had been altered or dismantled. And how was I to tell the truth of what happened 45 years ago when my memory of some events was as sharp as a stone edge and of others was flattened out like waves retreating from sand?

Important questions surfaced. Should I change some of the names? Can I compress several characters into one? I remembered e. e. cummings' favorite caveat: "Don't let facts get in the way of truth." Did I have the right to invent scenes? I had asked these questions in the classroom, answered assuredly when I was examining someone else's text, but wavered now, in the middle of a scene, when no concrete details leaped from my notes or brain. I found myself asking about the role of imagination in the memoir, about the relationship of the memoir to journalism, creative nonfiction and even fiction itself.

In this age of proliferating memoirs, reality television and docudramas, these questions are inevitable, challenging, divisive and as ubiquitous as children disliking okra. But the
answers are elusive. They range from the strict adherence to known facts, accurate dialogue and photographic representa-
tion to who let the dogs out—meaning there are no hard and fast gates in this world of literary nonfiction. Noted editor
William Zinsser, in his book *Inventing the Truth: The Art and Craft of Memoir*, which includes essays by Annie Dillard,
Frank McCourt and Toni Morrison, says in his introduction, “Memoir writers must manufacture a text, imposing narrative
order on a jumble of half-remembered events. With that feat of manipulation they arrive at a truth that is theirs alone, not
quite like that of anybody else who was present at the same events.”

**More than a Memoir**

I set my posts as close as I could to the truth I remem-
bered and could verify, and I was comfortable
with chronological order, but I
wanted the story to
live as an engaging
work of art as well. At one point, one of the
chapters was presented as
a series of letters I had
adapted from some I had
sent to Juanita. That plan
was later discarded.
Another chapter used the
tall-tale format about three
boys on a raucous jaunt.
That was retained. Since I
wanted meaning to take place
on several levels, not just the
level of what-happened-next, I
introduced a sequence of brief
scenes about bees and ants and
swamps which I tied together at
the end in order to enhance the significance of a young man's
understanding of his connection to society. I realized that
these devices might not be immediately recognized, but that
was all right—understanding and pleasure often happen below
a conscious grasp.

My favorite device was the epiphany, a brief moment
when even the commonest object or situation reveals a signif-
icant meaning. For example, if you listen to a strained, whis-
pered conversation at the next table in a restaurant, one that
jumps from subject to subject, you probably can imagine the
texture and tone of two peoples' whole lives together. James
Joyce used to carry around 3 x 5 cards, and at parties, pubs
and parades, he would epiphonize a gesture or action, and
then use it in one of his books.

I didn't do that when I was growing up, but in recap-
turing the events I included in *Outside Shooter*, I realized how
my own memory worked. I could remember individual
scenes better than sequences of events, so I developed a
method of connecting epiphanies. Important scenes early in
the book could be brought back later when they could pro-
vide insight into the development of a character's mind. The
result, perhaps, could surprise and delight both the character
and the reader.

Here is an example, in three scenes, of how it works in the
book:
The first is when John Casterlow and Oscar
Robertson, both black, shake hands immediately following
Indianapolis' Crispus Attucks High School's defeat of the
Muncie Central Bearcats in the 1955 "Dream Game":

Oscar had dropped in 25 points, and John had
21. I reached to shake Oscar's hand, but it was extended
toward John's.

'A war,' Oscar said.

'I know, man,' John said. 'You did great.'

'You, too. You, too,' Oscar said.

I watched them looking at each other. Then I
watched them understand. I don't know what they under-
stood, but they were looking past the eyes into something
deeper. Only a year ago, I had done that with John and
seen a friend, someone who would understand without
words. But Oscar and John had gone somewhere else, I
thought. They weren't on the same team, but they were in
the same place.

Much later in the story I prepare to pass out petitions
on the Louisiana State University campus and expect a con-
frontation with fellow students and, possibly, police. Juanita
is apprehensive. When I say lightheartedly that surely she
would save me if I got in trouble, she says she wouldn't:

'I stepped back, feeling as though air had been
pulled from around me. 'Does that mean you don't love
me enough to save me?'

She smiled, shook her head slowly, and came into
my arms. 'It's not about love, darling,' she said. 'It's about
saving yourself.'

In the silence, as we held each other, I let her
words sink in. Slowly I felt the rightness of them. They
seemed true to her life. How else had she learned to
survive, to live, to relate to others, without drowning? I
suddenly thought of what my mother had once said about
having to save yourself. I didn't know my mother's life. I
couldn't understand. I knew Juanita's life. I felt closer to
her now than ever before.
The connection between these two scenes is finally made following early civil rights protests in 1960, when black students from Southern University marched on downtown Baton Rouge, sat at lunch counters and demanded their rights. I was told my help wasn’t needed. This protest was theirs.

For the first time, I thought I understood what John Casterlow and Oscar Robertson saw when the two basketball adversaries shook hands at the end of a game. Color did matter. Maybe it would not forever, but for now, it was a bond that only they, at the deepest level, could share. How could that not be true? My wife’s bond with herself was rooted in the same perception. We don’t choose our circumstances, but we certainly rise or fall on what and who we learn to trust. If she trusted herself more than me, she was right to do so. She had learned from long experience that she would not let herself down. I was still learning.

We all were.

I really did engage the world that way, bits and pieces coming together, surprising myself when forgotten events would connect with current ones, and I would realize that I had discovered something important for me. In time, I learned to trust that process, realizing I didn’t always need to hammer knowledge and understanding into my brain, but could let it come on its own terms.

Writing *Outside Shooter* took me far beyond my basketball seasons in high school and college, a history I could relive in a scrapbook way, but not a meaningful one. Certainly, the experiences of exhilaration, despair, competition, personal measurement and the dynamics of a community are all reflected inside the fixed lines, locker rooms and coliseums of this national pastime. But basketball is not life. It is a game. When I finished playing, I moved it into the garage with lawn mowers and other items on my “To Do (occasionally) List,” but when a movie stirred the blood again, I brought it back into the living room. I’m glad I did, because I found that in my youth, though I didn’t know it at the time, I had not only escaped the world I was born into, but had also taken from it the joy, knowledge and limits of the escape. An outside shooter may go his own way, but he’s still part of the team.

Federal Grant Helps Nursing Students Boost Their Cultural Sensitivity

BY ELIZABETH O. COOPER

■ Embroiled in an abusive relationship, a woman reluctantly confides in you, her healthcare provider. How do you respond?

■ An older woman consistently refuses to have a mammogram. How do you convince her to be tested?

■ A homeless man has been diagnosed with a mental illness. How do you ensure that he is treated with dignity and compassion?

■ A man refuses treatment for a potentially life-threatening medical condition because of his religious convictions. How do you show respect for his religion while persuading him to accept treatment?
These are just a few examples of situations many nurse practitioners are facing as the country’s population becomes increasingly culturally diverse. By 2010, two out of five people in the United States will be minorities. Despite this rapid increase, many healthcare providers are unprepared to deal with the different needs of diverse populations. Insensitive responses or an unwillingness to acknowledge and understand different cultural beliefs could prevent patients from accessing the care they need.

To counter that, Old Dominion University’s School of Nursing has obtained a $533,000 federal grant to enhance students’ cultural competency. The Educating Culturally Competent Nurse Practitioners in Virginia project is a comprehensive effort to teach students in the school’s family, women’s health and pediatric nurse practitioner program how to better serve more diverse patients. The grant will also be used to attract culturally diverse undergraduate and graduate students and faculty to the school. This push for cultural sensitivity comes on the heels of an Institute of Medicine Quality Chasm report showing that minorities are often treated differently in the healthcare system. In response, new guidelines from the Nurse Practitioner Primary Care Competencies of the U.S. Department of Health and Human Services require programs nationwide to teach nursing students how to be more culturally sensitive.

“What we are doing is applicable to other programs across the country,” says Laurel Garzon, graduate program director for nursing and the grant’s project director. “This is an opportunity to provide leadership in understanding diverse populations. All practitioner programs in the country are dealing with this and might want to adopt this method.”

According to Garzon, a variety of factors come into play when healthcare providers show insensitivity toward other cultures. “Some of it is related to bias on the part of the provider. Some of it’s related to a lack of knowledge. It’s very easy to make somebody a stereotype, but we have to ensure we have provided students with the competency to work with multicultural groups.”
Assessing and Strengthening Cultural Competency

In the first year of the grant, nursing faculty are measuring students’ levels of cultural competency to determine their attitudes about various populations. They are also developing ways—such as panel discussions, guest speakers, lectures and class assignments—to incorporate cultural sensitivity into the curriculum. Those methods will be implemented during the next academic year.

Using a self-assessment tool, students reflect on their attitudes regarding a variety of groups, including the elderly, homosexuals, those from other cultures and domestic violence survivors. The survey also asks about students’ own cultural groups to give them a better sense of the group with which they identify. “A lot of diversity is invisible,” says Stacey Plichta, associate professor of community and environmental health. “If you don’t think about diversity in broad terms, you don’t think to look for it or ask for it.”

In developing the curriculum, Old Dominion is conducting focus groups using people from diverse populations, who represent various ethnic, economic, religious, gender and sexual preference situations, as well as special health needs such as mental illness, HIV and AIDS. “We want to find out their perceptions of healthcare providers, their experiences and how we can help providers be more sensitive,” says Richardean Benjamin, associate professor of nursing.

The focus groups are also a way for the nursing school to diversify its student and faculty populations, as well as to help abate the nationwide nursing shortage. “We are seeking to increase the diversity of our applicant pool,” Garzon says, noting that only 10 percent of the school’s graduate students are non-white females, and only 12 percent to 15 percent of undergraduate students are minorities. “We want to be sure we get the message out using some of these community groups. As we reach out to diverse populations, they start to think about health careers.”

Acting Out Diversity

Nursing students have already been honing their cultural sensitivity skills by participating in standardized cases using professional actors as patients. This role-playing is part of a program with Eastern Virginia Medical School’s Thomas Center. Actors represent patients from various socio-economic backgrounds, and students are evaluated on how well they work with the “patients.” Although most cases take place in Norfolk, the patient actors drive to several of Old Dominion’s TELETECHNET sites to play roles with distance learning nursing students, many of whom only see patients from their own cultural group.

“These standardized patients are excellent at giving students feedback,” says Carolyn Rutledge, associate professor of nursing. “The students have been positive about the standardized patients and ask for more sessions. They are finding out that understanding patient care isn’t about the provider. You have to separate yourself from your biases.”

One recent mock situation focused on the unique healthcare needs of a lesbian. “After the encounter, there was quite a bit of surprise about how open the patient could be, and all the information the nurses should consider,” Rutledge says, noting that “alternative lifestyles are tough for many students.”
Improving Knowledge and Communication

Often, stereotypical views of diverse cultures arise from a lack of knowledge and poor communication on both the part of the practitioner and the patient. “We really don’t talk well together,” Garzon says. “We don’t listen. We don’t hear.” In addition, many patients from diverse backgrounds distrust healthcare providers and have difficulty accessing medical care due to cost and other factors.

“A lot of times it’s simply ignorance,” Plichta adds. “If a nurse practitioner doesn’t understand the dynamics of working with women in violent relationships and asks ‘Why don’t you just leave him?’ that’s the worst thing he or she can say. Women who survive violence will be walking in with physical and mental health problems. If a healthcare provider doesn’t know, he or she may be ordering all kinds of unnecessary procedures.”

Rutledge recalls the time a patient came to her office complaining of an ear infection, when in fact she was a victim of domestic abuse. “A lot of times, patients don’t know who is taking the call at the front desk and won’t give the correct information because of the shame tied to it.”

Embarrassment often plays a role with older women when it comes to breast health. “Older women are less likely to get mammograms,” Garzon notes. “They feel like healthcare providers are not interested in what they have to say. They are not comfortable talking about breasts or other private issues.”

In other cases, diseases, such as hypertension, are treated differently based on the ethnicity of the patient. “Different medications such as diuretics are found to have better outcomes in African Americans than in whites,” Rutledge says.

She suggests nurse practitioners take time to learn about a patient’s family history, country of origin, educational level, socioeconomic class, religious affiliation, native language, participation in ethnic and neighborhood activities and spouse’s ethnic history. However, it is difficult to fit all of that into one visit, especially with the steadily declining amount of time healthcare providers spend with individual patients.

“We really emphasize to students that they might not get all the information in one visit, and that they can have patients come back for a follow-up if they have issues they need to explore,” Rutledge adds, noting that in addition to dialogue, healthcare workers can find out the information through assessment sheets and other formats. “The picture grows as you get more information. We’re trying to give the students a lot of tools to help them better assess their patients.”

However, some patients resist giving a lot of personal information, maintaining that the provider is prying into areas that have nothing to do with their health.

“As a provider the best you can do is be open, be caring, and try to develop a connection with them,” Rutledge says. “It’s the patient’s choice to come in and reach out. We just have to open the door for them.”

Benjamin adds that while patients may initially believe the questions are intrusive, many will open up if they are reassured that the provider is not making judgments about them. “If a patient feels the provider cares enough to ask certain questions, they are more apt to open up.”

Plichta adds that many healthcare providers have not encountered diverse groups and base their attitudes and response on their life experiences. “There’s no reason to think that just because someone is in health care, they are any more or any less knowledgeable about different cultures. Our students are representative of the communities they come from, and everybody comes with attitudes when they walk in the door. There may be some natural growth in cultural competency as they go through the nurse practitioner program. The question is to what extent there is natural growth and how can we help the students really grow.”
Researchers Lead International Endeavor to Enhance Digital Libraries

BY ELIZABETH O. COOPER

Forget about the Dewey Decimal System and card catalogs. When it comes to federated digital libraries, Old Dominion University researchers are utilizing cutting-edge technology to connect Internet users with a vast array of information resources.

Digital libraries are becoming increasingly popular research areas for information retrieval of database methods and techniques. Universities, governmental agencies, scientific organizations and other groups are opting to collaboratively build and own a massive, centrally pooled library of data that users can access with just a few keyboard clicks. Four faculty members in Old Dominion’s Department of Computer Sciences are leading an internationally recognized effort to construct and demonstrate novel digital library services. The group’s work has been funded by various federal and state agencies, including the National Science Foundation, NASA, Los Alamos National Laboratory and the U.S. Navy.

“The most important problem facing digital libraries is that all digital libraries are islands,” says Kurt Maly, chair of computer science, who is leading Old Dominion’s digital library group along with Mohammad Zubair, professor of computer science. “Each digital library owns its software and user group and has its own purpose.”
According to Maly, connecting these islands makes different information resources from anywhere on the World Wide Web more accessible to users. Enter the Open Archives Initiative. The OAI, which evolved from the need to increase access to scholarly publications by creating interoperable digital libraries, solves problems of digital library interoperability by defining simple protocols for information retrieval.

The Beginnings of OAI

Launched in 1998 at the Los Alamos National Laboratory, the core concept of OAI was initially known as the “Santa Fe Convention.” The Universal Preprint Service Prototye was developed under the lead of Old Dominion’s research team. The Prototype harvested nearly 200,000 records from several different archives and created an attractive environment for users. “It was incredibly difficult to do, but we built it and it worked,” recalls Maly.

The OAI divided the world into data providers and service providers. Data providers consisted of digital libraries that expose metadata (which is basically data about data), including a topic’s author, title and other crucial information that identifies the material to all who wish to access it. Service providers harvest metadata, putting the information together to provide a service, such as a search.

“To relate it to the physical world, I make copies of a catalog of cards and put them in one case so users can come to that place and look at any part of the book in which they are interested,” explains Zubair.

The group returned to Los Alamos in 1999, at which time the Santa Fe Convention was renamed the Open Archives Initiative, and an international movement to build bridges across islands of digital libraries took shape.

“OAI was born, and the movement really blossomed,” Maly recalls. “Libraries all over the world were participating. OAI does for digital libraries what the Internet did for islands of isolated networks.”

ARC – the Google of Digital Libraries

Xiaoming Liu, a Ph.D. student in computer science, Maly, Zubair and Michael Nelson, assistant professor in computer science, immediately set out to develop ARC, the first federated digital library which went online in 2001. One of the first federated search services based on OAI protocols, ARC harvests metadata from various OAI compliant archives, standardizes them and stores them in a search service. As a federation of over 160 libraries, ARC currently has more than 6 million metadata records.

“The contents are at the U.S. Library of Congress,” Maly says. “But the metadata is in Old Dominion’s service. We point to the contents.”

Zubair compares searching ARC to using the Google search engine to find Web pages. “What Google has done for the Web, we want to do for digital libraries.”

Maly adds that Google handles billions of Web sites. “We are probably three orders of magnitudes away from that.”

More than 160 digital libraries participate in ARC, including the Library of Congress, Virginia Tech, HNU University of Berlin and ImageBase. All have joined OAI and are OAI compliant. “This is a living federation,” says Maly. “We go out daily and harvest the latest things published in the libraries. Every day there will be more articles. A year ago, we had 1.5 million records. This has become one of the major pieces of software that other universities use to establish smaller communities of libraries.”

He adds that other organizations that are not part of ARC have used software developed by Old Dominion computer scientists to create their own communities of federated digital libraries.

“Many digital libraries do not announce OAI compliance to everybody. They want to be a small community where everyone in the community uses it, but it’s not necessarily known to the world.”

Agencies can create a federation of digital libraries for their own interest group, such as ARCHON, a federated digital library for physics communities. The Old Dominion digital library group has been instrumental in developing ARCHON. “It has richer metadata,” says Maly. “We can do a lot more and provide higher services. It’s a nice thing we can do for specified libraries that we cannot do for general ones because there’s too much information in a general digital library.”

Along with ARC and ARCHON, Old Dominion’s digital library group claims DP9, a method in which Web crawlers and search engines, such as Google, harvest OAI repositories. Developed by Old Dominion computer science doctoral students, DP9 software issues commands to a digital library and presents the results in a format that the Web crawler can understand.

“It’s like a broker between the Web, the database and the crawler,” Maly explains. “When you search in Google, you are only searching in the shallow Web. The deep Web is hidden from all search engines. Anything in a database anywhere can be in the deep Web. Search engines can crawl around and find links to other Web pages with DP9 and can get a lot of information.”

Researchers seeking an abundance of data were the impetus for creating digital libraries. The first major funding for digital libraries came about in 1995 when the National Science Foundation funded the Digital Library Initiative. Along with the Carnegie Mellon Foundation, the NSF provided the most funding for digital libraries. The National Science Digital Library is a major NSF program, which includes 70 projects and has a broad group of members. Old Dominion’s Digital Library Group oversees three of those projects, including ARCHON.
Directing Traffic in Digital Libraries

Although they began as a tool for academicians, digital libraries have recently been developed for the public. "Nowadays, the digital library is really meant for everyone," Maly says.

To direct traffic in digital libraries and ensure searches are orderly, Nelson is working with Buckets. These intelligent, mobile, data structures transfer the responsibility of preservation and content maintenance from the archive and the archivist to the object in question. Buckets protect, manage and mobilize a library's content and basic services. "They are small, portable digital libraries that can be moved around and can communicate with each other," Maly notes.

In addition, Old Dominion has received a $300,000 two-year NSF grant to build personalized, self-sustainable, digital libraries. A traditional digital library is based on a centralized framework, which requires an organization in the community to take the lead in providing the hardware and software infrastructure and developing processes to maintain the content. The Old Dominion group is investigating alternate models for digital libraries based on peer-to-peer networks. These networks are decentralized, distributed and autonomous, which support evolution of communities from the bottom up – a similarity to evolution of communities in social networks.

"You search for whatever people have in the digital library," Maly explains. "People join the peer-to-peer network on their own. The software brings people with common interests together."

Zubair adds that anyone can join the peer-to-peer network for free. "Everyone just runs it themselves. If you publish, you have to put metadata in it. Each one has to invest an effort to make the whole thing work. So much content in digital libraries is not being organized. That will be where the peer-to-peer network plays a role."

Maly adds that much of this content exists on organizations' Web sites, but they usually do not include metadata. "Metadata is what makes searches successful," he adds. "Everyone does a little bit of work, and the whole community benefits. You get what you need and fast."

However, despite the growing popularity of digital libraries, not everyone is jumping on the bandwagon. "Some commercial publishers refuse to be part of a federated digital library," says Maly. "It's a little bit of a contest to them rather than a collaboration."

Still, he adds that digital libraries are quickly becoming a force to reckon with on the Internet, with all of them based on OAI compliance. "This will become the future. It's already evolved tremendously in just a few years."

"Nowadays, the digital library is really meant for everyone."

– Kurt Maly

"What Google has done for the Web, we want to do for digital libraries."

– Mohammad Zubair
Bioelectrics refers to the use of pulsed power, or the application of powerful electrical pulses, for extremely short periods of time, to manipulate biological cells, tissues and/or organisms.

Researchers at the Center for Bioelectrics, which opened in fall 2003, are testing the use of these high-intensity electrical surges to remove diseased or unwanted cells or groups of cells, such as tumors. Use of this technology in medicine and biology is the first of its kind in the world and has extraordinary potential to treat persons with cancer and other conditions. A promising branch of bioelectrics within environmental sciences involves using electric pulses to generate nonthermal ionized gases (cold plasmas) as a new, environmentally benign, nonchemical technology for bacterial, viral and chemical decontamination.

The Center for Bioelectrics was developed as a research initiative Enterprise Center within the Batten College of Engineering and Technology at Old Dominion University in partnership with Eastern Virginia Medical School. The Center is located on the fifth floor of the Norfolk Public Health Building in Norfolk, Va. Working closely within the Center are Karl Schoenbach, Director, from the Batten College of Engineering and Technology at Old Dominion University; and Stephen Beebe and E. Stephen Buescher, both of the Center for Pediatric Research, a joint program of Eastern Virginia Medical School and Children’s Hospital of The King’s Daughters.

Its mission is to increase scientific knowledge and understanding of how electromagnetic fields and ionized gases interact with biological cells and to apply this knowledge to the development of medical diagnostics and therapeutics, and to environmental decontamination.
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For information on research opportunities, contact Robert L. Ash, Interim Vice President for Research, at (757) 683-3460 or rash@odu.edu.

For leasing information in the Old Dominion University Research Park, contact Julie R. Adie, Director, Real Estate Development, at (757) 683-3418, by fax at (757) 683-5679 or jadie@odu.edu.