“We were taking hearts from animals and profusing them on an apparatus and could actually keep them beating for a period of time.”
Clarke said of a project he worked on at UW.

Although the first class Clarke attended was not to study, but to be studied by a psychology instructor, his association with the University began as the son of a former zoology department head and pre-med adviser, the late L. Floyd Clarke.

Clarke said his father had the single most influence on his life and his career, serving as a catalyst by planting the early seeds of what has already been a fruitful career as a heart surgeon, an assistant professor of surgery for the University of Colorado Health Sciences Center and the chief of cardiothoracic surgery at both the Denver Children’s Hospital and the health sciences center.

By the time Clarke was in third grade, he was attending a University sponsored school where he eventually graduated from University Prep High School in 1961. Spending 13 years at University of Wyoming sponsored schools provided Clarke with some educational assets with dividends that continue to pay off for him.

One of those assets was being able to take University classes while attending high school, enabling Clarke to focus on classes related to the biological sciences during his college career.

Getting a few college courses out of the way early meant Clarke was always one step ahead of his fellow students who were, in effect, playing catch-up with him. His training was further advanced by working part-time during his college years in a Laramie hospital. He quickly got to know the surgeons in the hospital and eventually was allowed to do part of his work in surgery.

But Clarke’s association with the university was not totally academic. From his early childhood, his father took him to UW athletic events. As all young boys tend to do, Clarke looked up to the college athletes with awe and has fond memories of tennis players who gave him tennis balls and even a tennis racquet. He also served as a batboy for the UW baseball team.

“Almost everything that has happened to me subsequently is a result or is somehow influenced by the University of Wyoming,” Clarke said in an AlumNews interview from his Denver office in the University of Colorado Health Sciences Center complex.

During his college years, Clarke became involved in projects similar to what he’s now doing 23 years later in the medical profession.

“When at the University of Wyoming,” he said, “I developed a strong interest in the heart, probably fostered a lot by the professors I had.

“Dr. (Rollin H.) Denniston helped me with some projects involving the cardiovascular system which really peaked my interest.

“One of the most memorable experiences Clarke had at UW, was a lab project he and a few classmates were working on.

“We were taking hearts from animals and profusing them on an apparatus and could actually keep them beating for a period of time and we had a whole setup of monitoring equipment and all sorts of big machines,” Clarke said of the project.

“The camaraderie associated with that group of students working on the project and the fun we were having doing it and the input from the professors in helping us do an obviously much bigger experiment than they expected us to do because of the number of resources involved, and the kind of support we got doing it, is a memorable thing,” Clarke said.

“Something that I hope still goes on at the University and I know doesn’t go on in many major colleges, where you get that kind of individual attention for a group of people who want to do something special.”

The project was aimed at determining the effects of different drugs on the heart by monitoring the beat frequency, heart rate and general function of the heart and documenting the response of the heart to injections of the drugs.

After graduating from the University of Wyoming with honors in 1965, Clarke was admitted to the University of Colorado Health Sciences Center where he graduated, from medical school magna cum laude in 1969. Then he served his internship and residency at the center before traveling to London for a year, 1975-76, to specifically train in pediatric heart surgery.

Clarke returned from England to become the assistant director of the thoracic surgery residency training program at the health sciences center where he quickly rose through the ranks to chief of cardiothoracic surgery at the center and at the Denver Children’s Hospital. He continues to serve in those roles and is also an assistant professor of surgery and the director of the thoracic surgery residency training program at the time.

Today, Clarke is still profusing animal hearts. But now, the project is a little more serious, done over college days, although the training he received on the project at UW has served as the foundation for work for what he’s doing now.

“We’re working on an improved model,” Clarke said. “We’re working on the heart during cardiac surgery under certain circumstances — for surgery in small babies, which is something where there’s very little work done,” Clarke said.

“As it turns out, and what we’ve established in the past year, is the conventional way that the heart is preserved when you’re doing an operation on an adult is probably somewhat harmful to a baby. It’s probably better to do nothing than to do what they do to adult hearts.”

Another related project Clarke is working on is a method to deep freeze the whole heart to preserve it for purposes of future transplantation. Again, the emphasis of his study will be to aid babies.

“One problem we have with heart transplants with babies is there aren’t any donors available,” said Clarke, who is trained in heart surgery and heart transplantation. “The few donors that are available are never available when you have a baby that needs a heart.”

He said the unavailability of heart donors for babies leaves doctors with two choices, either to use a baboon heart as in the famed Baby Faye case or to preserve human hearts so they can have a type of storage bank to have a heart available when it is needed.

“We’re working on the second option,” Clarke said.

Currently, Clarke’s study is focusing on the optimum method and temperatures to utilize during the deep freeze method. “What they’re saying now, is that with the cryoprotective chemicals they’re now using, probably a slower freezing process and a more rapid thawing process is going to work a little bit better,” he said.

“One of the things we’re going to be looking at is whether or not a wet
Dr. David L. Clarke, Recipient
1985 University of Wyoming Distinguished Alumni Award

While at the University of Wyoming, Dr. David R. Clarke preserved hearts and injected them with drugs to study the effects of the drugs on the hearts. Today, Dr. Clarke is working on a system to thaw hearts, like in a water bath, is better or whether we ought to use microwaves for thawing. Microwaves are probably a little quicker, but it may be too quick and may cause too much molecular motion that you disrupt the cells more.

Technology for preserving various tissues by freezing them to minus 196 degrees Celsius is now becoming commercially available. The problem with freezing, Clarke said, is if ice crystals are formed, they may penetrate cell membranes and destroy them. Cryoprotectors minimize the ice crystal formation and stabilize the cells during the freezing process, he said.

Clarke is starting his study with very small hearts because the tissue mass has a lot to do with how effectively an organ can uniformly be cooled. "So we're starting with piglet hearts and we'll probably move up to puppies or goats or something like that before we move on to a human situation. It's a long-term project which is just now getting started," he said.

"I haven't really thought about it," Clarke said, "but the apparatus we're now using is not that far from the one incident he mentioned was the fraternity's acquisition of a 1920 model Ford engine from the Fort Collins area. He distinctly remembers he and his frat brothers driving the fire engine back to Laramie with a number of fraternity members taking strategic positions on the truck. Then the truth came out. "Of course, we could buy all the beer we wanted in Colorado, that was another reason to come to Colorado."

Although he wouldn't mention the person by name, Clarke also has vivid memories of an Indian frat brother who would always perform a fire dance when he drank. Unlike a rain dance to make it rain, the frat brother would actually remove his shoes and socks and dance on coals from the fire. "He never got burned or hurt or anything, so I guess it was all right," Clarke said.

On a more serious note, Clarke said receiving the Distinguished Alumni Award is extremely important to him, particularly on the emotional level because of his "real strong, life-long affiliation with the University of Wyoming."

As people travel through their various careers, there are a number of various awards or societies that are given to be expected if things go right, he said. But being a Distinguished Alumni is something that is not expected. "It's sort of something extra and it means a little more," Clarke said.

"The fact that a group of people thought enough of me to put my name in the nominations ... really means a lot. It ranks pretty high in terms of honors I've received."