

Biophysicists in Profile



Jonathan King

Jonathan King came to biophysics through athletics, a rather non-traditional channel. Born in Brooklyn, New York, King contracted polio at the age of three. Athletics helped him overcome some of the awkwardness in jumping and running that resulted from his bout with the disease. While at James Madison High School, King found his niche on the football team. It was playing tight end on his school team that enabled him to attend Yale University.

As a child, King was fascinated by how things are built, spending his time playing with erector sets, tinker toys, and model airplanes. In his freshman year at Yale, King encountered *Earnest C. Pollard*, one of the founders of the Biophysical Society. Pollard set King and others on a new and exciting course of study by using their interests in construction into studying how biological structures are assembled. Pollard, who wrote the first textbook for this nascent field called Biophysics, “was a very charismatic spokesman for this emerging discipline,” says King, “by the end of the semester, he had converted four of us.”

King also discovered that varsity athletics conflicted with the afternoon science labs and decided that he “had a bet-

ter chance of making a living as a scientist than as an athlete.”

After Yale, King did his graduate work at Caltech. There he worked with *Robert Edgar*, the microbial geneticist who made the first identification of the genes that control virus structural proteins. At Caltech, King studied how genes controlled protein structure and wrote his thesis on the genetic control of the assembly of bacteriophage T4.

King did his postdoctoral fellowship at the Medical Research Council in Cambridge, England, with *Sir Aaron Klug*, who was developing new methods of electron microscopy for studying the structure of viruses.

These were also the Vietnam War years, and that conflict served as catalyst for much of King’s future advocacy efforts. “I’m a staunch believer,” King says, “in science for all, for the good of all.” During the Vietnam period, King worked actively with other young scientists opposed to the militarized use of science and technology, i.e., agent orange.

This belief in the social responsibility of science and of scientists has kept King involved in many organizations, working toward the structured support of civil science over militarized science. Since the war, this has translated into working for the disarmament of nuclear weapons and in the opposition of continued militarization of science and technology. King has worked on his disarmament campaign through organizations that include the American Association for the Advancement of Science and the World Council of Churches, for which he coauthored *Science for Peace Resolution*, and the Council for Responsible Genetics.

When King arrived at MIT in 1970, he began working together with *David Botstein* and *Sherwood Casjens* on the mechanisms of icosahedral shell assembly and DNA packaging. They discovered a

novel class of proteins — scaffolding proteins — needed for the assembly of shells of viruses, which are absent from the final virus. The importance of that observation is only now being realized. “It was so new a concept,” King remembers, “that when we first made the discovery, I chewed my wife’s ears off about it for months.”

King’s study of mutants that prevented virus assembly led to his current focus on how the amino acid sequence of proteins determines their correctly folded structure. The discovery of special classes of mutations—temperature sensitive folding mutants—that specifically affected protein folding processes, made it possible to identify partially folded (and misfolded) intermediates for phage structural proteins. This led King’s group to studies of the failure of protein folding. “This area has become an important etiology of certain human diseases,” he explains, “and continues to cause problems in the research laboratory and in the biotechnology industry.” King also is involved in basic research of beta-sheet proteins, including the gamma crystallins of the human eye lens. In the last few years he has been working much more in collaboration with computational biologists in exploring how amino acid sequences control beta sheet folding, and how they prevent misfolding.

In addition to research, King has for the past 15 years taught a protein-folding problem course, which is taken by undergraduate and graduate students from diverse departments. He also teaches the protein biochemistry module of the core molecular biology lab.

In teaching biophysics, King emphasizes that molecules are the product of a few billion years of evolution, not the

(Continued on page 4.)

(Continued from page 3.)

product of the first principles taught in biology and chemistry, and that the role of biophysics is to reveal the surprising properties of the molecules. "Nature is richer, older and deeper than intelligence," King notes, "yet we are always surprised by its complexity."

King feels lucky that he has had very bright, collegial graduate students and postdocs, many of whom have become active in the Biophysical Society. King's concern with the difficulty many young scientists have in making the transition from student/postdoc, where they are taken care of and are under the guidance of someone, to associate professorships, where they have to make their own way, motivated him to establish a postdoc committee in the Society. The committee now has changed its name to Early Careers Committee and is chaired by one of Kings' former postdocs, *Patricia Clark*.

To those who are just entering the field of biophysics or those who may not have fully considered it, King advises that, "Biophysics is an extraordinary career

because you get to do good things for the world while having fun and getting paid for it." And, he notes, "One of the most important secrets in this field is that it is about cooperation and not competition." He has benefited from diverse productive collaborations with *Wah Chiu, Lila Gierasch, Peter Prevelige, Julian Sturtevent, George Thomas Jr., Robert Seckler, and George Benedek*.

King joined the Biophysical Society in 1976, and is quick to point out the importance of the communication societies provide. "One of the deepest aspects of society membership is the continual communication necessary between researchers and the broader audience," King explains, "through journals and meetings, which sharply accelerate scientific progress."

Societies, King adds, also act as the main reporting source to Congress and other federal government agencies. When the federal government is looking for information about a particular subject or field, it looks to the societies for this information, King notes. But it is also necessary to "remember that we are for the

most part public servants. We depend on taxpayers through federal NIH, NSF and DOE investment, and it is important to respect that."

Even though he works and teaches at a private university, King points out that all of education has depended on public investment in science and education. "I believe we are at a point in human history where every American should understand structure of protein, which requires further expensive universal collegiate education," King explains. He is currently working with various groups to promote the goal of universal higher education. "It's not acceptable that only one quarter of Americans can graduate from college," King says.

He is joined in this advocacy effort for public education by his wife, Jacqueline, a journalist who is also editor of *Parents Care*, a newspaper for the parents of children in public school. When not busy with teaching, research or advocacy, King is active in Cambridge youth athletics, coaching teams and his children Andrew, 15, and Aaron, 11 in soccer, basketball, and chess!

Annual Meeting Summaries

CPOW Sets Agenda

The Committee for the Professional Opportunities for Women (CPOW) met during the Society's Annual Meeting in San Francisco. Under the leadership of *Ishita Mukerji* of Wesleyan University, members discussed the initiation of several new projects that would benefit many demographic groups within the Biophysical Society, both in the short and long term. Among the activities to be undertaken in the next year are:

- An online survey of the need for childcare services at the Annual Meeting.



CPOW Members in photo: *Ishita Mukerji*(l), *Laura Juszczak* (r)

CPOW is working with the Early Careers Committee to design and distribute the survey.

- The Committee plans to sponsor a workshop at the 2003 Annual

Meeting in San Antonio on effective laboratory setup.

- A more proactive involvement in awards nominations and for recommending annual meeting speakers to the Program Committee.

Since many CPOW issues and initiatives resonate with a broad base of Society members, CPOW members agreed that the Committee name itself needs updating. Although no replacement was chosen, the Committee will continue to discuss a name change.

—*Laura J. Juszczak*,

Albert Einstein College of Medicine