Statement on the Administrative Home
for the Department of Computing and Information Sciences
at Kansas State University
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Philosophically where should the discipline of computing and information sciences fit within the administrative structure of this comprehensive land grant institution? That question that has occupied much thought since a move to the College of Engineering was suggested in the Fall 1991 restructuring plan. In this statement I share with you my recurring thoughts on this, a crucial question for the panel to consider. Pragmatic issues of the choice of administrative home will be covered later by Dr. Virg Wallentine.

The last time this question was seriously considered by this institution, I was a young staff member. Dr. Holly Fryer, an active advocate in that debate, made the persuasive argument then that this fledgling area was a discipline and it was indeed a science and therefore the College of Arts and Sciences would provide a more nurturing environment than the College of Engineering. That was 1967. Holly provided strong leadership and the department was launched as an independent unit in 1971.

Twenty five years later local computer scientists and our national professional organization believe that their field has matured enough that it is possible to describe its intellectual character in new and compelling ways [reference: "Computing as a Discipline", ACM Task Force on the Core of Computer Science, 1989]. With the advantage of this national wisdom to guide our discussions, we the faculty of Computing and Information Science Department unanimously feel that now the College of Engineering would provide an environment more suited to the type of discipline into which ours has evolved.

Points to be elaborated are the evolving character of computing science, the role of computing and information sciences at Kansas State University and the leverage that the university can gain by moving the department to the College of Engineering.

Computing and information science has evolved into a respectable science with one notable characteristic since that decision here in the 1960's. A recent statement created under the auspices of the Association for Computing Machinery, our academic and professional society, defines it thus:

> **... the systematic study of algorithmic processes --*their theory, analysis, design, efficiency, implementation, and application*--that describe and transform information.**

That definition is elaborated in the task force's report and includes the following distinguishing features:

> **...the roots of computing extend deeply into mathematics and engineering. Mathematics imparts analysis to the field: engineering imparts design. The discipline embraces its own theory, experimental method, and engineering, in contrast with most physical sciences, which are separate from the engineering disciplines that apply their findings (e.g., chemistry and chemical engineering principles). The science and engineering are inseparable because of the fundamental interplay between the scientific and engineering paradigms within the discipline.**
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> **... The essence of this (revolution in the way we think and in the way we express what we think) is procedural epistemology --the study of the structure of knowledge from an imperative point of view as opposed to the more declarative view of mathematics.**

Point one: computing and information science is a discipline whose foundational components are science and engineering and unlike other sciences those components are fundamentally inseparable.

It should come as no surprise to this panel for me to state that Kansas State University will not survive as a comprehensive university if the dramatic changes in the information environment are not accommodated by the technological and sociological milieu of our institution. Research prowess, especially in the sciences

including that social science field of education, will be achievable only through access to that vast, expanding and more importantly rich information environment.

As an illustrative example of this expansion, consider the technological delivery mechanism for such information rich environments, the international networks. It was predicted in the late 1980's that in the early 2000's, gigabyte networks would be available in this country. Such capability will bring most libraries, traditional and electronic, to our desks, capabilities for extensive visual and multi-media environments, e.g., tele-conferencing and virtual reality, and real-time data and knowledge bases at reasonable costs into our offices, laboratories and classrooms. Early 2000? Hardly. Experimental gigabyte networks are now running in four geographic areas of this nation. The prediction this March by officials of the telecommunications industry is that by the 1994-96 time frame we at Kansas State University can tap into the resources represented by this massive step forward in information structure and transfer. We will no longer talk in terms of bits but of blobs of information.

Information is growing rapidly and to aid comprehension and processing, new forms of information presentation must be made available. The genetic databases of today will look infinitesimal in size and rudimentary in presentation, i.e., bit or character strings, to those of just a few years down the road. For our agricultural, veterinary and biological geneticists to compete they must have this genetic information base in the presentation forms now under development. Students could learn the structure of organisms by walking through them, architects could design buildings interactively by visually experiencing the interim designs, engineers could traverse the roads and bridges or even the energy transformation devices they have designed -- too far in the future? -- not at all. This is reality and exists in other learning environments. But we at Kansas State University lack the information base and the technological capture mechanisms to participate.

Be cognizant that we stand on the brink of seizing an opportunity that rarely comes. From this clean low population geographic area, researchers could be at no disadvantage information-wise to researchers in the center of the large crowded and often polluted population centers of this world.

Point two: if Kansas State University is to survive as a research institution, the pivotal role of information environments and the delivery systems for new representations of information must be recognized and provided. Thus computing and information science is important if we are to maintain the research component of the comprehensive university we are.

But for this Department of Computing and Information Sciences, from what administrative platform can it best serve the needs of Kansas State University? Or stated from a different perspective, how can this university leverage this asset to the greatest benefit?

A charge of discipline ethnocentricity or worse could be made to the claim that the computing and information scientists should be the motivating force and the directional impetus for this information revolution. We are mature enough to know there are many others who could and must contribute to the continued evolution in the information environment available to our University. We believe, however, that the Department of Computing and Information Sciences whose primary focus is the information environment is a valuable intellectual asset of the University. That Department should be housed where its assets can be leveraged to meet the information challenges to today's and tomorrow's universities.

Engineering is a major focus of this land grant institution. An administrative unit whose composition and history accepts and nurtures not just the theoretical, modelling and experimental components of our discipline but also provides a natural environment in which the design and engineering aspects can grow for the good of the department but much more importantly for the good the University.

Conclusion: Kansas State University needs to respond in an effective and efficient way to the challenge of providing the informational environment required to have academically competitive faculties. Leverage of the asset called the Computing and Information Science Department to the greatest benefit of the entire university seems prudent. Computing and information science is a discipline in which the science and engineering components are fundamentally inseparable. A major mission of this comprehensive land grant university is engineering and engineering provides an environment which supports both of the inseparable components of this discipline. The faculty of Computing and Information Sciences respectfully requests that the Department be moved to the College of Engineering.