

New Program Planning Summary

CLEMSON UNIVERSITY

REQUESTING TO OFFER

**CLEMSON INSTITUTE
FOR HUMAN FACTORS AND ERGONOMICS**

November 1, 2008



James F. Barker, FAIA
President
Clemson University

Clemson Institute for Human Factors and Ergonomics

Proposed New Institute Structure: This summary describes the proposed Clemson Institute for Human Factors and Ergonomics (for the remainder of this document, it will be referred to as the “Institute”). At this time the Institute will focus on research and does not propose to create new academic programs. The Institute will be formed of Clemson University Faculty conducting research in human factors and ergonomics. Membership in the Institute will be contingent upon the faculty member’s continued interest and activity in the Institute. Participating faculty members and postdoctoral fellows will be given the title Associate of the Institute. Graduate and undergraduate students who play a significant role in the Institute through funded research may be named Fellows and Junior Fellows of the Institute respectively.

At Clemson University, the majority of faculty stakeholders in the human factors and ergonomics research areas are spread across the College of Business and Behavioral Sciences and the College of Engineering and Science. As such, the Director and Associate Director will be selected from the Institute Associates in these colleges, one from each college, for renewable three year terms. No formal rotation is required.

Dr. Eric Muth, Professor of Psychology, will serve as the first Director and Dr. Scott Shappell, Professor of Industrial Engineering, will serve as the first Associate Director. Their relevant existing grants will serve as the foundation of the Institute. Additionally, the Institute will create an Advisory Board with one member from the Clemson University research community (not an Associate of the Institute), and at least two external to the Clemson University community, with at least one prominent leader within the human factors and ergonomics community.

Proposed date of implementation: Upon approval.

Justification for the Institute: As defined by the Human Factors and Ergonomics Society, human factors and ergonomics is, “*the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data, and other methods to design in order to optimize human well-being and overall system performance.*” Academic disciplines that commonly train individuals and perform research in human factors and ergonomics are psychology, industrial engineering, and computer science. At Clemson University, many of these disciplines are housed within the College of Business and Behavioral Sciences and the College of Engineering and Science. It is also common for individuals from fields outside of these academic disciplines (e.g., medicine, architecture, etc.) to conduct research in human factors and ergonomics. Hence, it is expected that faculty in other academic departments at Clemson University who perform research in human factors and ergonomics will also be active in the Institute.

At Clemson University, human factors and ergonomics faculty conduct research into human behavior and performance in a variety of contexts and settings including health care delivery environments, automobiles and home settings, in interactions with technology in general and computers in particular, and in high stress conditions such as military combat and other high risk environments. Research that explores the effect of complex and stressful conditions on human behavior and performance is of growing importance particularly as technology becomes more pervasive, life expectancy increases, and businesses, health care providers, and governments seek ways to predict and influence human performance. Indeed, the field of Human Factors and Ergonomics advocates systematic use of such knowledge to achieve compatibility in the design of interactive systems of people, machines, and environments to ensure their effectiveness, safety, and ease of performance.

To put the diverse nature of the Clemson Institute for Human Factors and Ergonomics into perspective, consider the following example. Current research at Clemson University has revealed that well over 80% of off-duty traffic fatalities among US military personnel involve human factors. Of particular concern is the extraordinarily large proportion of fatal accidents involving motorcycles. As a result, Clemson University scientists are developing a multidisciplinary line of research aimed at reducing 2-wheel motorcycle fatalities. In addition to the already developed relationship with national organizations like the Motorcycle Safety Foundation and the National Highway Transportation Safety Administration, a natural collaboration with CU-ICAR will be established. Equally important however, are the interactions that will emerge from multiple departments both at Clemson and partners among South Carolina's universities and community colleges. Put simply, from the design of personal protective equipment to human performance and roadway markings, Clemson University can quickly become the national leader in the field of motorcycle safety and performance.

Briefly, the goals of the Institute are as follows:

1. To unite the human factors and ergonomics faculty and provide a coordinated effort to bring national prominence to Clemson University within this rapidly growing research area.
2. To attract additional funding opportunities that would not otherwise be made available to Clemson University.
3. To provide support to faculty conducting research in human factors and ergonomics in finding and managing grants and contracts.

The above goals of the Institute provide the guiding principles to unite and strengthen existing programs of education and research at Clemson University and the capability to build resources to be allocated toward these priorities. The human factors and ergonomics faculty at Clemson University have proven track records in graduate programs and research. However, these faculties are spread among multiple departments at Clemson University. Human factors and ergonomics often capture only a small portion of the mission and priorities of these departments. As a consequence, resources allocated specifically to human factors and ergonomics are often below the threshold that would lead the human factors and ergonomics programs to national prominence. A unifying Institute can accomplish this goal through shared and targeted resources.

As the major stakeholders, the Psychology, Industrial Engineering, Computer Science and Electrical and Computer Engineering departments have worked well together in the past in both educating students and performing research. It is atypical for these diverse departments to have such close ties. This strength is an attraction for graduate students and funding agents and can be leveraged by Clemson University. The top goal of the Institute relates to formalizing this cross-department, cross-college relationship in a way that can be acknowledged both internally and externally.

Externally, this union will afford better marketing of the capabilities of the individual programs and the Institute. For example, the Institute will fund advertisements at annual national meetings such as the Human Factors and Ergonomics Society, American Psychological Association, and SIGCHI, the conference on Human Factors in Computing. The Institute will also develop its own web site, which will focus on the collaborative research across the departments, but will also link to the individual program web sites. This marketing will attract potential graduate students', potential future faculty and research sponsors' attention, supporting goals one and two.

Internally, this union will support goal number three in which resources can be shared, grown and managed efficiently to achieve increased funding. For example, by routing their funded research through one administrative unit, it will be possible to allocate a portion of overhead returns to administrative

support. Currently, no one department has sufficient funding to offer dedicated administrative support to the human factors and ergonomics research effort. By combining efforts and reaching a level of scale to justify administrative support, some burden will be taken off of individual investigators, freeing up their time to secure additional funding and complete additional research. It also can attract faculty who might not otherwise participate in funded research due to the administrative burden associated with managing a grant, including faculty who might increase their work in human factors and ergonomics given the opportunity. In addition, current funded investigators will find it easier to involve more faculty members and students in funded research collaborations

Anticipated Institute demand and productivity: There are currently over \$750,000 in active grant and contract expenditures that could be associated with the Institute if it existed. The goal is to reach \$1,000,000 in new annual funding activity associated with the Institute within a 5 year time period, then \$2,000,000 within 10 years.

Assessment of extent to which the Institute duplicates other Institutes in the state: Clemson University's Department of Psychology has the only accredited Human Factors graduate degree program in South Carolina. It is one of only fourteen such programs accredited by the Human Factors and Ergonomics Society (http://www.hfes.org/Web/Students/grad_programs.html). There are no other doctoral programs in Human Factors Psychology in South Carolina. Currently in the US there are only eighteen Human Factors Psychology programs offering the Ph.D. degree. North Carolina, Georgia, and Florida each have one university offering the Ph.D. in Human Factors Psychology, and Virginia has two. The other states with at least one program are California, Connecticut, Illinois, Indiana, Kansas, New Mexico, Ohio, South Dakota, and Texas. The Institute is the next logical extension of the successful graduate program at Clemson University.

Virginia Tech has a center (<http://hfec.vt.edu/>) that is similar in nature to the proposed Institute. However, Virginia Tech's center is concentrated in industrial engineering and is not an interdisciplinary Institute such as the one proposed here at Clemson University. The Institute here at Clemson University, once established, would make us more competitive with organized Centers such as those at Virginia Tech, with the advantage of having interdisciplinary teams involving psychologists, industrial engineers, and computer scientists, among others.

Relationship of the Institute to existing programs: As described above, the Institute is related to current graduate programs within the Departments of Industrial Engineering, Psychology, Electrical and Computer Engineering, and the School of Computing. Further, the faculty within these departments will serve as the leadership of this Institute.

Relationship of the Institute to other institutions via inter-institutional cooperation: Once the Institute is established and infrastructure is in place, the Institute will submit a proposal for a large government funded "center" grant. This effort will link Clemson to other Universities and Centers such as the one described above at Virginia Tech. The initial Directors of the Institute have collaborators in both government and academic laboratories across the country.

Sources of Funding: The Institute will generate funding for research. The departments will provide cost share by releasing the director and associate director from one course per year. The indirects from research projects will cover the college commitment and the release time cost of the departments, with any surplus used to develop new initiatives.