sediments. This information will be integrated into an ecological risk assessment which can be applied, initially, to the Ocean Course at Kiawah Island and potentially, to a wider distribution of courses.

The golf course research group consists of seven graduate students and five faculty members from the Department of Environmental Toxicology and TIWET at Clemson University. The pilot study on the Ocean Course, Kiawah Island, began in July, 1991. This investigation focused on two areas: 1) developing a thorough water sampling program to measure the quantity of fertilizers and pesticides reaching adjacent marshes; and 2) assessing the potential for exposure of wildlife on the Ocean Course and adjacent habitats.

The development of Kiawah was conducted with environmental foresight, resulting in a residential and resort community endowed with diverse habitat and abundant wildlife. The Ocean Course, constructed with an innovative drainage system that captures runoff from rainfall and irrigation, is situated in a sensitive ecosystem of sand dunes and tidal marsh. Chemicals used on the course are deterred from entering adjacent wetlands and the water can be recycled.

TIWET efforts have concentrated on gathering background information on the Ocean Course and on substantiating irrigation and chemical application procedures. Maps and diagrams were developed and used to describe the flow of irrigation and drainage water on the course. Turf management practices and pesticides used on the Ocean Course were documented. Chemical application records were collated and the irrigation schedule was recorded. Water samples have been collected for preliminary analysis of fertilizer and pesticide residues.

Texas A&M University

Human Benefits of Golf Course Views: Emotional Well-Being, Stress and Performance - Dr. Louis G. Tassinary and Dr. Roger S. Ulrich

While golf courses are an important type of land use in most cities and suburban areas, there is little scientific evidence regarding the human benefits that golf courses make possible. More specifically, there is virtually no sound, convincing research regarding the "influence of golf courses on the psychological and physical well-being of people." The absence of research on these issues is not a problem for the avid golfer, for whom the benefits of golf courses and the game are intuitively self-evident. The great majority of Americans, however, are not golfers, and accordingly lack the direct experience that is probably necessary for an intuitive appreciation of the benefits of golf courses and the game.

The lack of research on golf course benefits can be a major problem both from the standpoint of communicating or marketing the benefits of the game to the non-golfing public, and/or conveying the benefits of a proposed golf course to either a planning commission, a zoning board, a city council, or a group of environmentalists. The reality is that intuitively-based arguments about the human benefits of golf courses, however commonsensical to golfers, carry little or no weight in the face of the more publicized or tangibly documented issues such as pesticide and nutrient runoff, consumption of scarce water resources in semi-arid areas, or membership polices based on racial or ethnic criteria.

A major feature of the two proposed studies is the emphasis placed on state-of-the-art *physiological* and *behavioral* measurement techniques, in combination with self-report techniques, such as questionnaires, for examining the effects of golf courses on human well-being and cognitive performance.

The initial plan was to conduct two studies. The main objective of the first study was to identify and measure the physiological and emotional effects of off-site views of golf courses and compare these effects with those resulting from viewing other common types of landscapes. The main objective of the second study was to identify and measure the effects of viewing golf courses on the performance of cognitive tasks relevant to productivity in the workplace.

Performance on these tasks will be diagnostic of our capacity to either monitor or reject incoming information and to either analyze or synthesize diverse information. For example, a significant part of the project will focus on whether viewing a golf course elicits a positive mood, that in turn enhances performance on tasks related to creative thinking. Video footage has been taken in the Houston, San Antonio, Austin, Dallas/Fort Worth, and Sam Houston Forest areas. On the basis of this footage, a small group of candidate sites was selected from a large number of potential sites within each environmental category and videotaping was completed in the fall of 1992. The raw video footage for the first study has been pre-

viewed and cataloged, and the final editing was completed in January, 1993.

A systematic search of the mood induction literature over the past 20 years (>200 articles) using a number of electronic data bases and bound indexes was completed. As a result of this search, and taking into account the results from an informal pilot study (10 subjects), a music-based mood induction procedure was chosen in place of a verbal self-instructional procedure to elicit both the positive and negative moods for the comparison conditions in the second study.

Seventy-two color slides were made from digitized frames of our video material and pretested in a formal study completed last fall (100 subjects). The results of this study have allowed us to pick clearly positive and clearly negative video segments that represent golf course, forest, and urban environments for the second study. All of the necessary computer, data acquisition, physiological recording, and audiovisual equipment has been purchased, tested, and installed.

The research scientist on the project (Russ Parsons, Ph.D) has completed formal training in the software environment that will be used in the lab and has written and debugged the core of the computer programs required for experimental data acquisition and control. The results of our preliminary experiments were presented in October 1992 at the annual meeting of the Society for Experimental Social Psychology.

The anticipated benefits of the research will include: 1) the potential positive consequences of golf course location for off-site users will be identified, assessed, and made accessible for practitioners involved in land use decisions; 2) a precedent will be established for the training of graduate students in landscape architecture on the indirect health consequences of golf course design and location; 3) peer reviewed publications in established scientific journals; and 4) continued theory development in an ongoing basic research effort by the investigators to more fully characterize the dynamic relationship between humankind and the natural landscape.