

bound of $W(n^2)$ for this algorithm holds even for sparse matrices. The best known lower bounds are $c \times n^2$, for constants $c, b > 3$. Strassen suggests matrix multiplication requires strictly more than quadratic time. Several categories for finding an upper bound to this algorithm persist: bilinear algorithms, approximate algorithms and Schönhage's theorem, ultra fast solutions to tensor products, and Coppersmith-Winograd algorithm. We examine these approaches with regard to numerical accuracy and stability while considering the current open questions and a possible choice for solution.

A FLUID-BASED STOCHASTIC APPROACH FOR ANALYZING AND MODELING NETWORK TRAFFIC. Yen-Hung Hu, Department of Computer Science, Hampton University, Hampton, VA 23668. In this paper, a fluid-based stochastic approach for modeling normal and malicious network activities is investigated and developed. To achieve the goal of this paper, several existing raw network traffic traces are analyzed first. And then a fluid-based stochastic network model for simulating normal and malicious network traffics according to characteristics of such raw traffic traces is investigated and developed. Since observing that the majority of the collected network traffic traces demonstrates self-similar behavior, this paper investigates this self-similar characteristic and adopts it as a key factor of identifying malicious activities. Several simulation results are included and the raw traffic traces shown in this paper are gathered by the Cooperative Association for Internet Data Analysis (CADIA).

Education

THE WAY FORWARD: UNDERSTANDING OUR ECOLOGICAL PLACE. Emma D. Burnett¹, Alana S. Burton² & Eugene G. Maurakis¹, ¹Department of Biology, University of Richmond, Richmond VA 23173, ²Department of Geology, College of William and Mary, Williamsburg VA 23185. This documentary film explores the modern relationship between Americans and the natural world by examining the perspectives of individuals with unique personal and professional connections to the environment. Interviews conducted with these individuals illuminate numerous facets of our relationship with the environment, from a farmer's reasons for investing in the long-term health of the environment, to a scientist's perspective on the role of skepticism in the pursuit of truth and the biggest challenges to educating the public. Some of the general questions addressed include the implications of our attitude towards the environment on our health and the health of future generations, challenges to the pursuit of general knowledge and understanding, including polarized viewpoints and special interest groups, and potential steps in overcoming these challenges. Through the examination of these topics by interview subjects from different backgrounds and occupations, the film presents various ways of thinking about the environmental problems that we face and highlights the importance of individual action and constructive dialogue.

ENVIRONMENTAL ISSUES AND AMERICAN ATTITUDES. Alana S. Burton¹, Eugene G. Maurakis², and David V. Grimes³, ¹College of William and Mary, ²Dept. of Biology, University of Richmond, & ³Old Dominion Appalachian Trail Club. In July

2012 the “Survey on Human- Environment Interaction” was launched using SurveyMonkey. The survey aimed to explore how humans view their relationship to the natural world as well as how demographics influence beliefs about environmental issues. In September, with 383 respondents, the survey was closed for analysis. Over 90% of respondents agreed that there is a direct link between human health and environmental health and that environmental degradation is disturbing; therefore, this consensus may serve as a useful backdrop to environmental education. Age, education level, and political affiliation were found to play an important role in how humans view environmental issues; therefore, these characteristics may be useful in the creation of educational programs.

CURRICULUM MATERIALS AS A XOMPANION TO A LARGE MUSEUM EXIBITION ON HUMAN HEALTH AND WELLNESS. David B. Hagan, Science Museum of Virginia, 2500 W. Broad Street, Richmond, VA 23220. The Science Museum of Virginia has a statewide mission for informal science education. It has spent 14 months in research, planning and design for an 8,000 square foot interactive exhibit gallery focused on the human body and mind. It also produced a five-minute education curriculum video on the human body, its systems, chemistry, and physiology. Research on the function and visitor learning was conducted on the interactive exhibits using formative evaluation. Student groups (elementary through high school) were observed engaging with a selected set from each of the three main categories of exhibits, (Body, Mind and Play). The results of these evaluation cycles were used to implement modifications to the interactive exhibit units. In the Body section the exhibits included: an isometric bench press, a test of strength in pushing a fixed bar in a standing position; a test of balance on a 12-foot tightrope six inches above the floor; a test of reaction time in response to visual stimuli; a test of the visitor’s ability to assume a yoga position and hold it for ten seconds; a test of the visitor’s flexibility as measured by their ability to fit into a small space; and three exhibits focused on concepts related to nutrition, diet and food preparation in the Kitchen Theater. Visitor experiences in the Mind section include psychology-related engagements: a self-reported measure of happiness; two different short-term memory tests; a challenge of the visitor’s capability to cooperate in a group to succeed at a timed challenge; a demonstration of eye-tracking sensors showing where the visitor’s gaze was focused on an image; and a Sleep Theater experience that takes the visitor on a narrated journey through a typical night’s sleep showing the sleep cycles and levels of sleep. The Play section of the exhibit includes: playing percussion instruments, attempting to match and hold a given note as a test of perfect pitch; and an interactive overview of pastimes, hobbies and sports. The exhibit has been tested and is in the process of installation.

Environmental Science

PLANTS AS INDICATORS OF DISTURBANCE AT THE ABRAMS CREEK WETLANDS, A PROTECTED CALCAREOUS ECOSYSTEM IN WINCHESTER AND FREDERICK COUNTY, VIRGINIA. J. T. Walker, V. Thomas, W. S. Bousquet, D. F. Cooper, B. Ridgeway, S. Dieudonné, S. Kochman, J. Miller & G. Ayers. Environmental Studies Program, Shenandoah University, Winchester, Virginia 22601.