CAIN PROJECT
THE CAIN PROJECT IN ENGINEERING
AND PROFESSIONAL COMMUNICATION

The Communication Factor

Supporting excellence in communication

Cain Project Welcomes Two New Members

Corinne Weisgerber, a new Cain Project instructor, received her PhD in Communication Arts and Sciences at Pennsylvania State University. She moved to Houston to join Prairie View A&M University, where she taught public speaking, communication technology, and mass media writing classes. Corinne's research interests include interpersonal, computer-mediated, and health communication, and she is currently pursuing research in online health communication.

Corinne became interested in the Cain Project because of its focus on interdisciplinary work. At Penn State, Corinne was involved in a number of interdisciplinary teaching initiatives. She greatly enjoyed working with faculty from Philosophy, Engineering and Information Sciences and Technology departments.

Penn State's, Learning Edge Academic Program (LEAP), enables entering freshmen to simultaneously take two completely integrated courses from different departments. As part of this program, Corinne taught communication classes to incoming students in cooperation with Penn State's engineering and philosophy departments. She collaborated with the faculty members from these departments to combine their respective classes. As a result, students were encouraged to integrate what they learned in both courses through activities such as developing multi-media presentations about their design projects or applying group problem-solving theories to their engineering problems. Corinne hopes to continue this interdisciplinary work as a Cain Project instructor.

Deborah Ausman brings to the team over 15 years of professional experience as a science writer. She will implement writing assignments in courses supported by the Cain Project; she is currently assisting with assignments in COMP 482, Design and Analysis of Algorithms, and MECH 431, Senior Design. Deborah also plans to forge ties between the Cain Project and Rice's nanotechnology research.

"Nanotechnology research requires interdisciplinary communication and teamwork, something that we at the Cain Project know a lot about," Deborah says. "There's a real opportunity for the Cain Project to help this field evolve and to arm Rice students to participate fully in this revolution."

Deborah is no stranger to the Rice campus, having completed a master's degree in English at Rice in 1995. She is also a regular contributor to Sallyport, Rice's alumni magazine. Her freelance writing business provides marketing communications support to scientific and technical clients. While she specializes in scientific software, biotechnology, and nanotechnology, she has written about everything from dual-core CPUs to defibrillators. She looks forward to a similar variety in the writing of science and engineering students at Rice.

New Addresses for Cain Project Faculty

Dr. Corinne Weisgerber
215H Anderson Biology X6328

Deborah Ausman
215B Anderson Biology X6144

Dr. Jan Hewitt
B107 Abercrombie X6224

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Communication Central to New CEVE Curriculum

The Department of Civil and Environmental Engineering has a new vision of students' futures. It has adopted a coherent curriculum that will prepare students to understand phenomena in a broad perspective. The sequence of courses will enable students to understand how biological, physical, and social systems affect engineering research and practice. The NSF recently approved a proposal to develop this vision into revised and new courses, materials, and a new portfolio system to showcase student work. The Cain Project will be involved in carrying out the grant.

Professor Phil Bedient believes that students need to understand the big picture for engineering projects from the beginning, something that was neglected in the past until students took advanced courses. In Bedient's CEVE 101 students are now giving presentations on major contemporary events from an engineering perspective, such as why the World Trade Center towers collapsed when attacked on September 11, 2001. The Cain Project will coach students in this course on their presentations, launching their careers in professional settings.

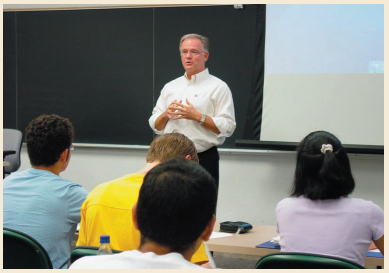
The curriculum is designed to help students deal with complexity, analyzing engineering projects in the context of international issues and sustainability as well as cultural and social situations. Students will work in diverse teams and learn about team leadership, communication, and intercultural team issues. Professor Pedro Alvarez, the new chair of the department, has been an enthusiastic sponsor for international activities.

CEVE students have already embarked on international service learning projects with Engineers Without Borders. A multiyear project involving bridge construction in Nicaragua is already underway. Several of the CEVE majors have participated in the Mayan Resorts internship, which gives them a chance to see large-scale real estate development projects in environmentally sensitive coastal areas in Mexico.

Students returning from international projects are being integrated into new roles that enable them to share the benefits of their experiences. Students can apply to be trained as international communication mentors for the Cain Project. At present these students assist in CEVE 412/512, Hydrologic Analysis, and present their final projects to different types of professional and international audiences. The international communication mentors practice with student teams, advising them on ways teams should adapt to the cultures they have observed.

Civil and Environmental Engineering: A Global Vision

Designs suited to environments



Dr. Bedient in CEVE 101

Engineers Without Borders trip

Dr. Volz discusses editing

All CEVE majors will soon be able to use a new software for creating an engineering and communication portfolio that will hold digital video presentations, PowerPoint files, reports, posters, and personal reflections on students' experiences. Students will be able to control access to their portfolios, selecting portions to be displayed to faculty advisors, prospective employers, and friends.

Several Cain Project team members are participating in the development of assignments and materials in support of the grant, and everyone is looking forward to seeing the results of a curriculum that is so thoroughly saturated with opportunities for students to achieve excellence in communication.

Worth a Thousand Words? How to Display Visual Data Effectively

Visuals are essential to scientific publication and presentation. In the last paper you read—or presentation you viewed—wasn't nearly all of the evidence presented in the form of graphs, tables, photographs, radiographs, or illustrations? Visuals show trends and illustrate processes more clearly than text.

Tips for visuals in oral presentations

- **Simplify your visual as much as possible**. When presenting your data on a slide, remember that the user is *not* a reader. The audience cannot assimilate great detail and will probably have very little time to process confusing data.

- **Avoid the lengthy titles and captions used in written documents**. Instead, use informative message headings. The following is an example from a figure that showed expression of the lacZ gene in mouse thymocytes, which was evidence for recombination having occurred in the cells:

  Figure title and caption in journal: *Time course of lacZ expression in thymocytes from Substance Y-treated mice. Mice were injected with… (long caption deleted)*

  Weak slide title (no message): *LacZ expression*

  Strong slide title (message): *Substance Y mediates recombination in thymocytes*

- **Tag your image with labels or explanations**. What needs definition? What should the audience focus on? What is being compared? Use arrows and text boxes to guide the audience to the most important features of the visual.

- **Avoid large tables in oral presentations**. If you *must* show a large table, use color bars or faint rules (not dark lines) to break up data.

- **Eliminate the legend in simple line graphs and label the lines instead**. Your audience will not need to jump back and forth between the legend and data to interpret the graph.

- **Use color effectively in bar and line graphs.** Avoid the overuse of decorative color and the layering of two colors of similar intensity (e.g., blue and red). Also, remember that about eight percent of your male audience could be red-green color blind.

Tips for visuals in written documents

- **Be cautious of colors when designing graphs for publication**. Your article will invariably be downloaded and printed on black-and-white printers or copied on black-and-white photocopiers. Therefore, even if the journal will be printing your article (or the relevant page) in color, avoid using color in bar and line graphs. If you choose to use color, check to see that the chosen colors differ enough in grayscale to contrast well when reproduced in black and white.

- **Keep your graphs, in general, as simple as possible**. Graphs created in 3D for purely aesthetic purposes are not as quickly interpreted by your audience and may even be misleading. Be cautious of moiré effects caused by busy fill patterns. Remove gridlines unless they are absolutely essential to the argument.

- **Write an accurate, descriptive title and caption for every figure**. Many readers scan an article and view figures and captions before reading the article itself; here's your chance to pique interest and engage readers in your article.

- **Remember to place captions correctly: *above* tables and *below* figures.** Check reports and other documents that won't be copy edited.

To sum up, visuals allow you to show data more effectively and tell the story of your research. When designing, remember to consider specific needs of your audience. Graduate students are invited to learn more at the Visual Display of Data Workshop, part of the Leadership and Professional Development (LPD) series. To sign up, go to http://www.owlnet.rice.edu/~cainproj/lpd/index.html.

Mary Purugganan, PhD, works with the writing mentors who support the biology courses.

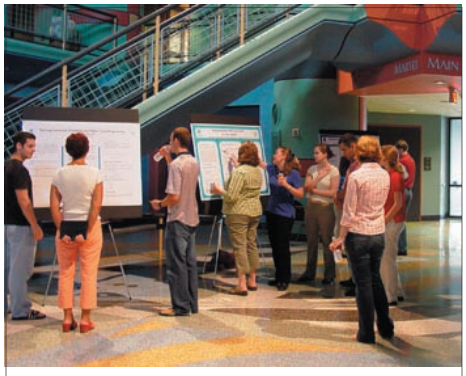
A Summer Interval for Rice's VIGRE Students

The VIGRE program, the NSF-funded Vertical Integration of Research and Education, is well into its second year at Rice.

VIGRE involves faculty, post-docs, graduate students, and undergraduates from three departments: Mathematics, Statistics, and Computational and Applied Mathematics. During the school year, these participants form interdisciplinary teams to investigate cutting-edge research problems. During the 2004-05 year, ten teams were formed, and the students and faculty in these teams studied problems in a wide range of areas from computational finance to statistical genomics to computational image processing.

Students from many of these teams continued their research in Summer 2005. For example, students working in Computational Neuroscience continued their work on a neuro-simulator that mathematically models the electrical behavior of neurons in a particular region of the hippocampus using computational methods. The work students are doing is of particular interest to the Knierim Lab at the University of Texas Health Science Center, which conducts experiments investigating questions such as this: "How do the neurons [in the brain] interact to construct a coherent, stable representation of a spatial environment?" Answers may lead to a better understanding of the processes of the brain specific to navigation, learning, and memory.

During the months of June and July, faculty and students also had the opportunity to attend "The VIGRE Interval" activities that began at 3 pm each Wednesday. The events kicked off with an Ice Cream Social on June 1 in which team members introduced



VIGRE participants examine the posters on display during the summer poster session.

themselves to other teams and discussed progress of their work. On June 8 and 15, the Cain Project sponsored three communication workshops: Giving Oral Presentations in the Math Sciences, Organizing Patterns for Written and Oral Reports, and Information Design: Principles and Practices. Updates from several VIGRE teams about the progress of their research were given during the end of June and beginning of July, while a final poster symposium capped off the summer activities on July 22.

VIGRE Teams and Faculty Leaders

Computational Algebraic Geometry, *Dr. Hassett*
Developmental Biology, *Dr. Forman*
Computational Finance, *Dr. Ensor*
Statistical Genomics, *Dr. Guerra*
Computational Neuroscience, *Dr. S. Cox*
Metabolic Engineering, *Dr. S. Cox*
Simulation-Driven Optimization: Control, Design, and Inverse Problems, *Dr. Symes and Dr. Heinkenschloss*
Geometric Calculus of Variations, *Dr. Hardt and Dr. M. Wolf*
Stochastic Processes and Molecular Biology, *Dr. D. Cox and Dr. S. Cox*
Computational Image Processing, *Dr. Hyde, Dr. Tapia, and Dr. Zhang*

http://www.vigre.rice.edu

Leadership and Professional Development Courses - Fall '05

Presenting Your Research
Monday, Oct. 3rd - 3:00 - 5:00 pm

How to Recognize and Avoid Plagiarism
Date and location to be determined

How to Write a Paper for Publication
Friday, Oct. 7th - 3:00 - 5:00 pm

How to Plan, Write, and Defend your Thesis:
Friday, Oct. 21st - 3:00 - 5:00 pm

Data Display: How to Effectively Present Your Findings
Friday, Nov. 10th - 10 am - Noon

To register for these courses, visit:
http://www.owlnet.rice.edu/~cainproj

The Cain Project in Engineering and Professional Communication helps Rice students become expert speakers and writers. Because of the Gordon and Mary Cain Foundation's generous gift, undergraduate and graduate students in science and engineering are developing the communication skills necessary for successful professional leadership.

Linda Driskill, PhD — Director
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