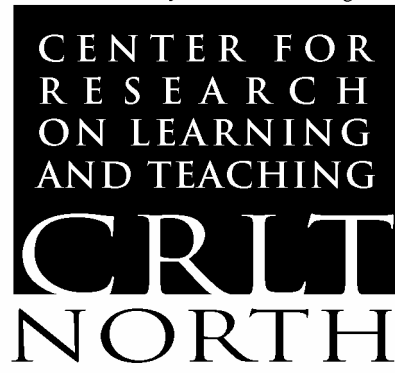


University of Michigan



CRLT North
Report for College of Engineering
2003–2004

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CRLT North
Report for College of Engineering
June 1, 2003–May 31, 2004

During the 2003-2004 academic year, CRLT and CRLT North provided a number of services to the College of Engineering. This report provides a summary of those services and is separated into several sections as follows:

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Report Overview

The Center for Research on Learning and Teaching (CRLT) has a more than 40 year history of partnering with faculty at U-M to enhance student learning across campus. In January 2004, CRLT collaborated with the College of Engineering (CoE) to establish CRLT North, a new office on North Campus to better serve the engineering community. CRLT North's Engineering Programs are coordinated by an experienced engineering educator in close collaboration with CoE faculty and administrators. This new partnership exemplifies CoE's commitment to achieving excellence in engineering education, one of the highest priority goals identified by the recent CoE strategic planning process. Many of the CRLT North Engineering Programs will prove to be especially useful in realizing the CoE's goal. Some of those programs include:

- Consultations with instructors to evaluate and improve all aspects of a student's education,
- Customized services to help departments balance and integrate various components of the engineering curriculum, and
- Special programs to help faculty and graduate student instructors (GSIs) match educational technologies or teaching methods to learning objectives.

Statistical Summary of CRLT North Services

Approximately 1139 CoE participants in attendance at programs
<ul style="list-style-type: none"> • 213 at orientation sessions for faculty or GSIs • 200 at seminars or workshops about teaching and learning • 407 at engineering performances by the CRLT Players theatre troupe • 273 at customized presentations or events • 46 at Preparing Future Faculty events
Approximately 833 CoE client services via consultations and midterm student feedback sessions
<ul style="list-style-type: none"> • 112 consultations by CRLT North staff, including Engineering Graduate Student Mentors (EGSMs) to faculty, GSIs, administrators, and staff • 118 midterm student feedback sessions by CRLT North staff, including EGSMs, to individual faculty and GSIs • 423 E-mail or informal consultations and 180 resource E-mails by EGSMs to individual GSIs

CRLT North

One of CRLT's main goals for 2003-2004 academic year was the hiring of a full-time engineering educator to lead initiatives to improve engineering education and faculty development efforts in CoE. Dr. Cynthia J. Finelli was jointly hired by CoE and CRLT to fill this role, and she assumed full-time employment as Managing Director of CRLT North on July 14, 2003. Dr. Finelli is assisted in her efforts by several professional staff members from CRLT, including Drs. Matthew Kaplan, Vilma Mesa, Chris O'Neal, Mary Piontek, and Erping Zhu, and by program assistant Tina Chung.

CRLT North Office

CRLT North, a branch office of CRLT, was opened on North Campus in January 2004. The office is located on the fourth floor of the Engineering Research Building I. Establishing CRLT North involved coordinating renovations for the suite of office that includes: an office for the Managing Director (4117B); an office for other CRLT staff members (4117A); an open bay for a future administrative assistant (4112); and the Engineering Teaching Academy conference room (4113). In addition, furniture was ordered and installed in September and a copier/fax/printer and a computer with an internet connection and basic word processing software were installed. Also, Tina Chung was hired by CRLT in September 2003 to serve as the primary engineering program assistant.

Publicity and Outreach

To publicize CRLT North and describe the activities offered through the new office, several efforts were undertaken. A CRLT North brochure was professionally designed and distributed to the mailbox of every faculty member and GSI in CoE in January 2004. Also, www.engin.umich.edu/teaching/crltnorth, a Web site for CRLT North, went live in January 2004. According to CoE Web site statistics, there were 2380 page views at the CRLT North Web site through the end of the academic year. These hits included access to the workshop registration page, links to the CRLT North survey site, and other visits.

In addition, Dr. Finelli distributed a short electronic needs assessment survey for faculty and GSIs in CoE. Questions on the survey addressed the *types* of activities likely to be used and the *topics* of most interest. From the more than 80 responses, faculty and GSIs indicated the highest interest in lecturing effectively, teaching in large classes, using innovative teaching techniques, getting students to participate in class, meeting individually with a teaching consultant, participating in classroom observations with student feedback, and sharing experiences with colleagues.

Engineering Teaching Academy Subgroup for CRLT North

A subgroup of the Engineering Teaching Academy (ETA) was created in December 2003 to provide guidance and advice in planning activities for CRLT North. The ETA/CRLT North subgroup met for the first time in January 2004 and since then met approximately once per month during the academic year. The group talked about general keys to success (especially ensuring that activities are engineering specific and highly visible), decided upon "effective teaching" as a programming theme for the 2004-2005 academic year, discussed an underlying aim of the activities for the 2004-2005 academic year (to identify and strengthen the faculty learning community), and assisted in plans for the year.

Members of the ETA/CRLT North subgroup include the following:

- Scott Fogler, Professor of Chemical Engineering
- James Holloway, Associate Professor of Nuclear and Radio Science Engineering
- J. Wayne Jones, Professor of Materials Science and Engineering
- Tresa Pollock, Professor of Materials Science and Engineering
- Kenneth Powell, Professor of Aerospace Engineering
- Alan Wineman, Professor of Mechanical Engineering

College-Wide Services

Seminar Series for Engineering

During the Fall 2003 and Winter 2004 terms, CRLT North offered engineering-focused seminars and programs for faculty and GSIs. These programs brought instructors together to share ideas across disciplines, develop and improve their teaching skills, expand their repertoire of teaching methods, and gain new perspectives on teaching in CoE. The following sessions were offered:

- *Engineering Food For Thought Luncheon for GSIs.* 10/07/03. 25 participants.
- *Learning Styles: Implications for Teaching in the Sciences, Math, and Engineering.* 10/16/03. 38 participants.
- *Measuring ABET Objectives in the Engineering Classroom.* 02/18/04. 19 participants.
- *The teaching portfolio.* 03/03/04. 16 participants.
- *Student Teams in Engineering: How to Create Them, Manage Them, and Grade Them.* 03/30/04. 17 participants.
- *Integrating Instructional Technology into Engineering Courses.* 05/04/04. 16 participants.

Consultations

CRLT North professional staff provide individual consultation services to faculty, GSIs, administrators, and staff. Topics for consultations include curricular and instructional matters such as course design, integrating innovative approaches to teaching and learning, interpretation of student ratings, finding ways to improve teaching and learning in a class or discipline, and evaluating and using instructional technology. Further, in response to the increasing demand for evaluation services, CRLT North provides assistance and expertise to help individuals conceptualize, develop, and carry out evaluations related to educational innovation and to assist in all phases of grant design, including the planning, implementation, analysis, and dissemination of evaluation research.

During the 2003-2004 academic year, CRLT North staff held 19 consultations with individuals about issues related to teaching and learning and 17 consultations about research projects or proposal preparation. These consultations served individuals from various departments and programs, including:

Academic Support Services; Biomedical Engineering; Chemical Engineering; Electrical Engineering and Computer Science; Industrial and Operations Engineering; Materials Science Engineering; Naval Architecture and Marine Engineering; Student Leadership and Academic Services; Technical Communications; Undergraduate Education; and Women in Science and Engineering.

CRLT Players Theatre Troupe

The CRLT Players theatre troupe is composed of local professionals and student actors who enact performances to explore pedagogical practices, enhance teaching and learning, and support diversity at U-M. The program is primarily funded by the Office of the Provost, CoE, and LSA. The CRLT Players perform provocative, interactive sketches based on scripts that reflect research on the experiences of students in the classroom, especially students of color and women in the sciences and engineering. Following the presentation of a scenario, the audience members dialogue with the characters about the issues raised. A trained facilitator guides this discussion and provides research-based information relevant to the particular performance. Then, the CRLT Players perform a revised scenario in which the characters utilize different methods that allow all students to learn more effectively. This use of theatre has a powerful impact on instructors, helping them to gain insights and ideas for improving classroom practices.

For CoE, the CRLT Players performed the *ADVANCE Faculty Meeting* sketch (depicting the potential influence of faculty gender and rank on conversations during an important faculty meeting), the *Gender in the Classroom* sketch (exemplifying the “chilly” climate that women students may encounter in science and engineering classrooms), and the new *ADVANCE Mentoring* sketch (showing issues pertaining to responsibilities of both mentors and mentees in establishing and sustaining a successful mentoring relationship). Audiences for the performance included CoE graduate students, GSIs, faculty, department chairs, students in the graduate course ENG 580: Teaching Engineering, the Biomedical Engineering Department, and the Network of Women Scientists and Engineers. The following performances were offered:

- *Gender in the Classroom*. 09/06/03. 113 participants.
- *ADVANCE Faculty Meeting*. 09/23/03. 16 participants.
- *ADVANCE Faculty Meeting*. 11/17/03. 14 participants.
- *Gender in the Classroom*. 01/10/04. 69 participants.
- *ADVANCE Faculty Meeting*. 02/19/04. 19 participants.
- *ADVANCE Faculty Meeting*. 03/09/04. 36 participants.
- *Gender in the Classroom*. 03/10/04. 32 participants.
- *Mentoring Graduate Students*. 04/13/04. 41 participants.
- *Gender in the Classroom*. 04/23/04. 17 participants.
- Preview of *ADVANCE Mentoring*. 04/26/04. 50 participants.

Services for CoE Administrators, Departments, and Staff

CRLT North delivered several specialized services to engineering administrators, departments, and staff. These services consisted of individual consultations, presentations, department-specific initiatives, and service on college committees.

Consultations with Deans

The staff of CRLT North, including Constance Cook, Cynthia Finelli, and Vilma Mesa, met regularly with the Associate and Assistant Deans of CoE to consult about faculty development, teaching-related issues, and GSI training.

Presentations

To provide further guidance for CoE, CRLT North staff often present information at department and staff meetings and in individual classrooms. During the academic year, CRLT North staff made such presentations for 40 faculty of the Electrical Engineering and Computer Science

Department, for 12 faculty of the Chemical Engineering Department, for 10 people of the Undergraduate Management Team, and twice for 32 students in the graduate course ENG 580: Teaching Engineering.

Department-Specific Initiatives

First Year Issues

During the academic year, professional staff from CRLT North worked with the Assistant Dean of Undergraduate Education on issues related to the first year program. The First Year Issues Series—seminars intended specifically for faculty, GSIs, and staff involved in the first year program—was established in Winter 2004. The series included the following sessions:

- *An Overview of First Year Students and Issues Involved in Their Transition from High School to College*. 02/17/04. 17 participants.
- *Pedagogy to Enhance Retention of Under-Represented Students in Engineering*. 03/04/04. 25 participants.
- *Pedagogy in the Classroom: What Research Tells Us About Good Practice*. 03/19/04. 13 participants.
- *Learning about Learning Styles*. 03/31/04. 14 participants.

Materials Science Engineering Department

The Managing Director of CRLT North worked with several faculty in the Materials Science Engineering Department to plan a day-long workshop on *Undergraduate Laboratory Experiences*. The Managing Director facilitated the workshop at which three guests from other institutions presented their experiences, and the department dedicated time to talk about and develop ideal laboratory experiences. Fifteen faculty and staff participated in the session.

Committee Service

During the 2003-2004 academic year, the Managing Director served on the following CoE committees:

- Strategic Planning Implementation – Education Committee.
- Engineering Teaching Academy Planning Committee.
- Engineering Teaching Academy Full Committee.

Programs for CoE Faculty

New Faculty Orientation/Keys to the College Program

In conjunction with the Provost and Executive Vice President for Academic Affairs, CRLT organized and facilitated the campus-wide New Faculty Orientation on 08/27/03. Eleven engineering faculty participated in the program. In addition, the Managing Director of CRLT North assisted the Associate Dean of Academic Affairs in planning the Keys to the College session (orientation for new faculty in CoE), and she delivered an interactive discussion on research on best practices in higher education. Twenty new faculty participated in the program.

Midterm Student Feedbacks for Individual Instructors

CRLT North collects student feedback for individuals who wish to assess and improve their teaching during the term. A CRLT North consultant observes the class and then confers with the students about what is going well and what changes would improve the students' learning. The

consultant later meets with the instructor to report findings and discuss strategies for change. During the 2003–2004 academic year, CRLT North staff conducted 24 midterm student feedback sessions for faculty in the CoE.

Programs for CoE Graduate Student Instructors

GSI Teaching Orientations

Staff from CRLT North organized and facilitated teaching orientation programs for new CoE GSIs in Fall 2003 and Winter 2004. During the Fall 2003, 113 engineering GSIs participated in the session on 09/06/03; 69 engineering GSIs attended the Winter 2004 program on 01/10/04. Attendees at orientation received training in the fundamentals of effective teaching, as well as in teaching labs, handling office hours, and utilizing effective multicultural teaching. The orientations also featured two required practice teaching session for every GSI. Evaluations of orientations were positive (Average rating on the question “I have a better understanding of my role and responsibilities as a GSI” was 4.22/5.0 in fall and 4.11/5.0 in winter).

Engineering Graduate Student Mentors Program

CRLT North trained and managed the Engineering Graduate Student Mentors (EGSMs) group during both terms of the 2003-2004 academic year. Through this program, ten experienced GSIs were recruited by CRLT North to mentor 20–30 other GSIs each. CRLT North conducted mid-semester review meetings for each EGSM, and the GSIs also evaluated the mentors every term. Evaluations continue to be stellar, and the EGSMs continue to be extremely effective at offering individualized, professional development to CoE GSIs. The EGSM group met every other week during the term with 98% attendance

In Fall 2003 the EGSMs served 219 GSIs, and in Winter 2004 the EGSMs served 189 GSIs. The following table presents the number of GSIs who participated in various activities for each term.

Term (Total services provided)	Fall 2003 (317)	Winter 2004 (461)
Midterm student feedback sessions	40	54
Scheduled consultations on teaching	32	44
E-mail consultations	99	142
Informal consultations	63	119
Resource E-mails	82	98
Special events planned by EGSMs for GSIs	1	4

Support for American Society for Engineering Education

The U-M Student Chapter of the American Society for Engineering Education (ASEE) is an organization committed to furthering education in engineering. It offers programs designed to prepare interested graduate students for careers in academia, provide undergraduate students with a better understanding of graduate education, and support the increased involvement of under-represented minority groups in higher education. During the 2003-2004 academic year, CRLT North staff provided support for the ASEE student chapter in the following ways:

- Attended periodic meetings of the ASEE Student Chapter Executive Board.
- Participated in feedback sessions about two separate graduate student presentations at each of six meetings during the 2003 Summer Seminar Series. 110 participants total.
- Assisted with *Faculty Experiences Outside of the U-M* panel. 10/24/03. 20 participants.
- Delivered the *Educational Lecture* at the Outstanding Student Instructor Awards ceremony. 04/15/04. 22 participants.

Early Evaluation Study

As part of a university-wide initiative that emerged from the Provost's Task Force on Testing and Training of GSIs, staff from CRLT North conducted early (i.e., midterm) evaluations of CoE GSIs who were running their own section or lab in Fall 2003. Short student ratings forms from the Office of Evaluations and Examinations were distributed for 139 GSIs, and forms were received back for 78% of them. Those GSIs scoring at or below a threshold of 3.5 on Question 2 ("Overall this was an excellent GSI") were contacted by their EGSM and offered a consultation. This consultation was not mandatory and it was considered confidential. In total, 22 of the 108 GSIs for whom evaluation forms were received scored below the threshold. Of those, 14 met with an EGSM for a consultation. GSIs were evaluated again at the end of Fall Term 2003 using the standard end-of-term evaluations, and the change in score was analyzed. Those GSIs receiving consultations saw a positive impact on their end-of-term ratings (average improvement in score on Question 2 exceeded 0.20), and GSIs who were having trouble early in the term received the guidance and support they needed to improve their scores at the end of the term.

The early evaluation program is not expensive. The entire evaluation program cost only seven dollars per section or about \$1,900 for the all the GSIs teaching labs or discussions in the college. Although CRLT will not continue to offer this program, the center has recommended that CoE work to make Early Evaluations a standard part of department practice each term and that the availability of the EGSMs be advertised to all who participate in the early evaluations.

Preparing Future Faculty Events

In collaboration with the Horace H. Rackham School of Graduate Studies, CRLT offered the fifth annual *Rackham-CRLT Seminar on College Teaching: Preparing Future Faculty* in May 2004, with funding provided by the Provost's Office and Rackham. The seminar covered information about preparing for the academic job search and about higher education, as well as discussions of effective and reflective teaching. Twelve CoE graduate students were admitted to the seminar. The seminar was very highly rated and considered an invaluable experience by its participants.

In addition, a one-day Preparing Future Faculty seminar, *Getting Ready for an Academic Career*, was offered for the U-M community on 11/17/03. This seminar was designed to help graduate students and postdoctoral scholars prepare for the transition to faculty jobs, and it featured sessions about what it means to pursue an academic career, how to prepare for the job search process, faculty work life and expectations at different types of colleges and universities, compiling a teaching portfolio and developing a curriculum vitae for the job market. A total of 34 graduate students from CoE participated in the session.

CRLT North Staff

Cynthia Finelli, Managing Director of CRLT North

Cynthia Finelli holds a joint appointment in CoE and CRLT. She earned a B.S.E.E., an M.S.E.E., and a Ph.D. from the University of Michigan, and she returned to U-M after ten years at Kettering University. While at Kettering, she was the Richard L. Terrell Professor of Excellence in Teaching, founding director of the Center for Excellence in Teaching and Learning, and associate professor of electrical engineering. She is a strong advocate of active, team-based learning in the classroom, and she received Kettering University's highest teaching award in 1997. At Kettering she was co-chair of both the Curriculum Reform Task Force and the Faculty Gender Equity Task Force, and she served on the university-wide Strategic Planning Task Force. At CRLT North, Cynthia is actively engaged in two engineering education research projects, one to identify and validate concrete approaches for reducing the frequency of cheating and the second to design a simple, reliable, and valid instrument for peer evaluation of teamwork.

Vilma Mesa, Instructional Consultant

Vilma Mesa has a B.S. in computer science and a B.S. in mathematics from the University of Los Andes, in Bogota, Columbia, and an M.A. and a Ph.D. in mathematics education from the University of Georgia. At the University of Los Andes, she taught undergraduate mathematics courses and participated in an initiative to incorporate technology into pre-calculus courses. Prior to joining CRLT in January 2003, Vilma was a research fellow and lecturer in the U-M School of Education where she conducted research on middle school mathematics teachers' professional development and on algebra teachers' use of curriculum materials and coordinated the master's of curriculum development program. As an instructional consultant, Vilma specializes in mathematics and engineering teaching.

Chris O'Neal, Instructional Consultant

Chris O'Neal earned his Ph.D. in biology from the University of Michigan. Chris has been with CRLT since 1999 and is currently the team leader for the Center's sciences, technology, engineering, and math team. Chris focuses on science instruction and has contributed to the design and development of campus-wide workshops on active learning, teaching problem-solving skills, and engaging students. In his customized services to various departments, Chris has addressed issues such as curriculum revision, the scholarship of teaching and learning, clinical instruction, and implementation of team-based learning. Chris is also a co-coordinator of the Rackham-CRLT Seminar on College Teaching: Preparing Future Faculty.

Mary Piontek, Evaluation Researcher

Mary Piontek earned a B.A. and M.A. in English Literature and a Ph.D. in measurement, research, and evaluation from Western Michigan University. She has considerable experience doing evaluation research in educational settings and has consulted with foundations, school districts, institutions of higher education, and organizations on program evaluation and educational research issues. In her current role, Mary works with individual faculty members, schools, and departments that need assistance assessing the effectiveness of initiatives to improve teaching and learning. She is the co-author of *Evaluation Strategies for Communicating and Reporting: Enhancing Learning in Organizations* (SAGE, 1996).

Erping Zhu, Instructional Technology Specialist and Instructional Consultant

Erping Zhu earned a Ph.D. in instructional systems technology from Indiana University. Prior to coming to CRLT, Erping was an instructional designer at Florida Gulf Coast University. She consults with faculty about integrating technology into their teaching and developing courses that incorporate instructional technology. Erping also collaborates with colleagues from U-M technology units to provide services and programs to faculty, such as the Teaching with Technology Institute and Enriching Scholarship Program. She recently co-authored a chapter, "Technology and Teaching," for W. McKeachie's Teaching Tips (Houghton Mifflin, 2002) and a monograph entitled "Technology and Teaching: Characteristics and Implications of an Integrated Approach" (Global Learning Center, U-M Business School, 2001).

Tina Chung, Seminar Series Coordinator and Program Assistant

Tina Chung earned her B.A. in Political Science at the University of Michigan in April 2004. Shortly after her graduation, Tina joined the CRLT team as an event planner, coordinating a series of campus-wide seminars and roundtable discussions for faculty, staff, and graduate students. Tina also has a joint appointment in CoE. She works closely with the Managing Director of CRLT North in organizing the multiple workshops and seminars specifically geared towards engineering faculty and GSIs.