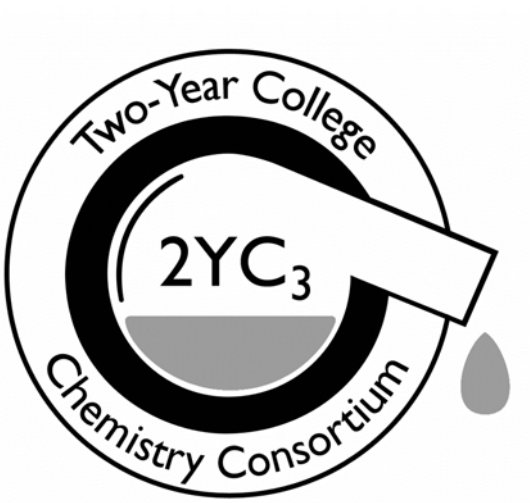
179th 2YC3 Conference (Southern)
"Technology and Chemical Education"



Durham Technical Community College

November 2-3, 2007

179th 2YC3 Conference (Southern)
"Technology and Chemical Education"
Durham Technical Community College
Durham, NC
November 2-3, 2007

Steering Committee

Program:	Dr. Mark Matthews, Durham Technical CC
Local Arrangements:	Dr. Tony Warren, Durham Technical CC
	Dr. Melinda Box, Duke University
Exhibits:	Dr. DeeDee Allen, Wake Technical CC
	Dr. Ajit Dixit, Wake Technical CC

Volunteers

Alpha Chi Sigma	Ted Espenscheid
(Rho Chapter – UNC-Chapel Hill):	Robin Felker
	Jeff Mighion
	Lena Hyatt
	Alice Hui
	Ken Randall
	Jordan Rapp
	Nick Swisher
	Meghan Wyrick
Durham Technical CC:	Carol Barmann
	Ingrid Charles
	Brenda Cleary
	Jorge Cortese
	Mary Marsha Cupitt
	Wayne Durkee
	Sandra Kircus
	Kimberly Metera
	Bijoy Patnaik
	Celeste Toombs

Special Thanks

We would like to acknowledge the following people for their generous time and assistance during the planning of this conference:

Durham Technical CC:
DTCC Instructional Technologies and Media Services
DTCC Science Department faculty
Liz Filipowski, Webmaster
Maria Fraser-Molina, Assistant VP (A&S) and University Transfer Department Head
Bill Ingram, Senior VP & Chief Instructional Officer and President-Elect
Jamia McIver, IST Departmental Secretary (room reservations)
Phail Wynn, President

Conference Exhibitors:
Anasazi Instruments
Daigger
Journal of Chemical Education
LATEst IDEas, Inc
Mettler-Toledo
MicroLab, Inc.
Pine Research Instrumentation
Prentice-Hall
Shimadzu Scientific Instruments, Inc.
Thomson Publishing
WebAssign

For a complete list of $2YC_3$ Industrial Sponsors, visit 2yc3.org/IndustrialSponsors.htm

National Officers/COCTYC Committee:

Chair	Michaeleen Lee, Bucks County CC (PA)
Chair Elect	Jeffrey Cramer, Stark State College of Technology (OH)
Treasurer/College Sponsors	Kelly Befus, Anoka Ramsey CC (MN)
Membership Co-Chairs	Lance S. Lund and Patty Pieper, Anoka Ramsey CC
Industrial Sponsor Chair	John Kenkel, Southeast CC (NE)
Newsletter Editor	Jim Schneider, Portland CC (OR)
Immediate Past Chair	Dolores C. Aquino, San Jacinto CC (TX)
Past Chair	Ed Kremer, Kansas City Kanses CC (KS)
Past Chair	Sonja Davidson, Tarrant County College, Northeast (TX)

2YC3 World Wide Web Page: 2yc3.org (Lance Lund, WebMaster)

Conference Program

Friday, November 2nd

8:00 – 9:00 **Registration**
Collins 278
(Auditorium)

Collins **Breakfast (Continental)**
Lobby

8:00 – 4:30 **Exhibits**
Collins
Lobby

9:00 – 9:15 **Welcome and Opening Remarks**
Collins 278
(Auditorium)

9:15 – 10:15 **Keynote Address: Teaching with technology: Implementing a Mobile Learning**
Collins 278 **Environment;** Dr. James Reeves, Chair of the Department of Chemistry and Biochemistry,
(Auditorium) University of North Carolina Wilmington, Wilmington, NC.

Technology offers great promise to revolutionize chemistry learning, but few of the technological innovations developed over the last twenty years have had any real impact on teaching, especially in the classroom. With the advent of the Tablet PC, however, this trend may be changing. This presentation will explore the factors that produced the current situation and discuss the possibilities and implications of a Tablet PC based Mobile Learning Environment.

10:15 – 10:35 **Refreshments**
Collins
Lobby

10:45 – 11:30 **2YC$_3$ General Meeting**
Collins 278
(Auditorium)

Session I - Presentations

11:45 – 12:30 **Addressing the gap between learning goals and learning outcomes in organic**
Collins 286 **chemistry;** Dr. Joel M. Karty, Associate Professor, Elon University, Elon, NC; Stephen R. Pruett, Associate Professor, Jefferson Community and Technical College, Louisville, KY

In this session, we will identify factors that may lead to a gap between learning goals and learning outcomes in a year-long organic chemistry course. Specifically, we will focus on this question: Does the traditional organization of material in organic chemistry textbooks contribute to students' tendencies to memorize and their lack of understanding of reactivity and reaction mechanisms?

We will then present a new organic chemistry curriculum designed to help our students better achieve the learning goals we set out. It is a "concepts first" approach, in which students review fundamental principles of structure and stability before they encounter mechanisms and reactions. Students then examine common elementary steps; they learn

each step's curved arrow notation, driving force, stereochemistry and regiochemistry. Finally, students learn that 1) complex reaction mechanisms are comprised of the common elementary steps they have previously learned, and 2) seemingly unrelated reactions can in fact be very closely related through their mechanisms.

OR

Collins 290 **Using a Tablet PC to Present Lecture Materials Online**; Dr. Andrew Aspaas, Professor, Anoka-Ramsey Community College, Cambridge, MN.

Tablet PCs and screen-recording software such as Camtasia Studio have allowed for some exciting advances in classroom technology. Lecture notes are handwritten in class and projected from the tablet PC. After class, the notes, audio, and screen recordings of the lecture can be accessed online. This allows students to quickly find and review any topic from any lecture. Student feedback has indicated this method enhances learning in class and after class. Come to this seminar for a demonstration of this technology along with some other uses that can benefit both students and instructors.

12:30 – 1:30 **Lunch**
Phillips 307, 308, & 309

Session II – Workshops

1:45 – 4:30 **MasteringChemistry by Pearson-Prentice Hall: The Next Generation of Online**
Collins 209 **Assessment;** Don O'Neal, Executive Science & Math Specialist, Pearson-Prentice Hall Publishing, Charlottesville, VA.

For years online homework systems have done an adequate job of testing students, but have done a poor job of tutoring students if they need help. MasteringChemistry is the first adaptive-learning online tutorial and assessment system for general chemistry. Based on extensive research of the precise concepts with which students struggle, the system is able to coach students with feedback specific to their needs, and with simpler sub-problems and hints when students get stuck. The result is targeted tutorial help to optimize student study time and maximize learning. This session will discuss online assessment (the pros and the cons), demonstrate the MasteringChemistry program and show how instructors can use the program to save time and identify student problems.

Session III – Presentations

1:45 – 2:30 **Technology in Chemical Education Research: from technology in the classroom to**
Collins 286 **nanotechnology in the lab**; Dr. Maria T. Oliver-Hoyo, Associate Professor of Chemistry, North Carolina State University, Raleigh, NC.

Chemical Education Research (CER) aims at elucidating what strengthens the teaching process and catalyzes learning. A wide variety of technological tools have been used in chemistry education for a number of decades, however, their impact on learning has not necessarily been shown. This talk will present different examples of technology use including technology for classroom management, promotion of student learning, and exposure to advances in chemical research.

OR

Collins 290 **Electronic homework system in an organic chemistry distance education course: It's not just for homework anymore!**, Dr. Kay Sandburg, Teaching Associate Professor, North Carolina State University, Raleigh, NC.

A combination of technology and creativity results in a distance education course that is as effective, interactive and challenging as that experienced in the traditional lecture setting. Key to the effectiveness of this course is the electronically delivered lecture work and homework components which give students immediate feedback. In addition to the traditional fill in the blank, multiple choice and matching question types, organic skeletal structures can be submitted for grading along with mechanism arrow drawings and questions requiring the manipulation of the 3-D jmol structures. Representative examples will be featured along with how they are integrated into the animated and voiced-over lecture in order to illicit a response from students that are graded for accuracy via the electronic assessment tool, WebAssign. Another advanced feature available in WebAssign that will be presented is the ability to deliver randomized questions for both the lecture work assignments and the homework assignments. Representative student communications will be presented which give evidence of the cooperative learning that can occur even at a distance along with the higher order thinking a student must use to give effective guidance leading to another's understanding especially considering that the questions are randomized.

2:45 – 3:30
Collins 258 **Preparing the Nanotechnology Workforce of Today at Forsyth Tech**, Kevin Conley, Program Coordinator, Nanotechnology, Forsyth Technical Community College, Winston-Salem, NC.

This presentation will begin with a brief introduction to the field, our curriculum, and the 52 companies in North Carolina currently manufacturing nano-enabled products and services. Emphasis will be given to our course requirements, cooperative education experience with industry, job placement of graduates, outreach to the community, and industrial advisory board. Hands-on activities will include product samples, molecular models of nanostructures, lego models of biological structures, our portable atomic-force microscopes and scanning-probe microscopes. From you, the audience, I seek (1) suggestions for how to better integrate chemistry course content into the nanotech curriculum; (2) networking contacts in education, industry, and government; and (3) assistance on attracting students and faculty from across the state to our expanding program.

OR

Collins 286 **Chemistry and Potential Solutions to Global Warming** Dr. Robert Jackson, Professor of Biology, Duke University, Durham, NC.

I will discuss some of the history of climate change and research taking place today to discover its consequences, including feedbacks with forests, grasslands, and other ecosystems. I will also discuss programs and policies to address climate change. These efforts include policy work with various energy and utility corporations and with states in the southeastern U.S.

3:45 – 4:30
Collins 290 **Using Computers to Engage Students in Science: Some things we can learn from light and color;** Dr. John R. Amend, Professor of Chemistry, Emeritus, Montana State University, Bozeman, MT.

Laboratory time is the most expensive time in education. We will demonstrate new computer-based tools and software strategies that reallocate a student's lab time to build solid understanding of chemical principles and to engage them in the process of discovery. Demonstrations will include MicroLab's unique sixteen-wavelength FASTspec™ scanning spectrophotometer to make simultaneous measurements of transmission, absorbance, scatter, and fluorescence in the 360-940 nm range

6:30 – 8:30
Radisson
2nd floor
rooms A,B,C

Social and Banquet – Radisson Hotel, Research Triangle Park
Banquet Speaker: Chemical Demonstrations: A means to motivate students, foster understanding of chemical concepts, and share the joy of doing chemistry, Dr. Kenneth Lyle, Lecturer, Duke University, Durham, NC.

Demonstrations of chemical phenomena have been, and continue to be used for a variety of purposes including as an instructional strategy to motivate students, and foster understanding and learning of chemical concepts. Public presentations of chemical demonstrations have been staged as a mechanism to inform the general public of chemistry, to stimulate interest in chemistry, and to share the joy of doing chemistry. There are a number of facets associated with my position as lecture-demonstrator for the Department of Chemistry at Duke University: support of the instructional program by staging live chemical demonstrations; conducting chemical outreach presentations; training students to perform demonstrations and participate in outreach presentations; and the creation of open-ended chemical demonstration videos that actively engage the viewer in the learning of chemical concepts. In this presentation I will share highlights of each of these facets.

Saturday, November 3

8:00 – 9:00
Collins 278
(Auditorium)

Registration

Collins
Lobby

Breakfast (Continental)

8:00 – 1:00
Collins
Lobby

Exhibits

Session IV – Workshops

9:00 – 4:00
Corporate
Education
Center
603, 604

Introduction to POGIL: Process-Oriented Guided Inquiry Learning.
Note: Participants must have pre-registered for this workshop through the POGIL website.

POGIL is a classroom and laboratory technique that seeks to simultaneously teach content and key process skills such as the ability to think analytically and work effectively as part of a collaborative team. A POGIL classroom or lab consists of any number of students working in small groups on specially designed guided inquiry materials. These materials supply students with data or information followed by leading questions designed to guide them toward formulation of their own valid conclusions - essentially a recapitulation of the scientific method. The instructor serves as facilitator, observing and periodically addressing individual and classroom-wide needs. POGIL is based on research indicating that A) teaching by telling does not work for most students, B) students who are part of an interactive community are more likely to be successful, and C) knowledge is personal; students enjoy themselves more and develop greater ownership over the material when they are given an opportunity to construct their own understanding. We have found that a discovery based team environment energizes students and provides instructors with instant and constant feedback about what their students understand and misunderstand. Students quickly pick up the message that logical thinking and teamwork are prized above simply getting "the correct answer." This emphasizes that learning is not a solitary task of memorizing information, but an interactive process of refining one's understanding and developing one's skills.

9:00 – 12:00 Collins 278 (Auditorium)

Fostering Learning and Understanding of Chemical Concepts Using Chemical Demonstration Videos, Kenneth Lyle, Lee Hong, Virginia Workman, Jessica Nicholson & Sara Jane Brandt, Duke University, Durham, NC.

Chemical demonstrations have been, and continue to be used as part of instructional programs to foster learning and understanding of chemical concepts. With the advent of the Internet, numerous videos of demonstrations are readily accessible. Many of these sites provide explanations of the chemistry involved, instructions regarding the preparation of materials and logistics for performing the demonstrations. However, there is very little information about ways an instructor may use the demonstration or video as an instructional strategy to foster learning, nor do they actively engage the viewer in critically thinking about the concepts and how they apply. In the belief that video demonstrations can be a valuable pedagogical tool, we are creating a series of videos that address these issues. Each video is designed to be open-ended, actively engaging the viewer in the application of the chemical concepts to actual chemical phenomena. In this session we will present three pilot-videos and one live demonstration.

Session V – Presentations

9:00 – 9:45 Collins 286

Undergraduate chemistry research at a 2-year liberal arts college program: the bioavailability of iron, manganese and zinc in micronutrient beverages; Dr. Peter R. Pascucci , University of Delaware, Georgetown, DE

Undergraduate research studies were conducted with students in a two-year Associate in Arts program located in southern Delaware. The faculty member was jump-started with a grant from RSEC (Research Site for Educators in Chemistry). This NSF funded program is intended to persuade PUI (Primarily Undergraduate Institution) faculty into mentoring undergraduate research. The students were exposed to modern instrumentation, field work and eventually some independent research projects. The research was conducted throughout the summer and continued into fall semester of 2006. The students eventually graduated from the program and entered the University of Delaware main campus as juniors majoring in the biological sciences. A brief description for the completion of one of the projects will be included. Also a synopsis of engaging first and second year students in scientific research will be discussed.

10:00 – 10:45 Collins 290

Elementary Classroom Visits - a General Chemistry Laboratory Project, Lance S. Lund, Professor, Anoka-Ramsey Community College, Coon Rapids, MN

Students taking the Principles of Chemistry II course on the Coon Rapids Campus of Anoka-Ramsey Community College participate in classroom visits at nearby elementary schools to perform chemistry demonstrations and hands-on activities as a part of the laboratory portion of the course. Information will be presented that explains how the elementary classroom visit program evolved, the types of activities that are conducted, the objectives of the visits, and the preparation and visit timeline. Some of the activities utilized by students in their visits will also be demonstrated.

10:45 – 11:00 Collins Lobby

Refreshments

Session VI – Roundtable Discussions

11:00 – 11:55 Collins 286 **The general and organic sequence – is it time for a change?** Moderator: Dr. Garnett Whitehurst, Instructor, Pamlico Community College, New Bern, NC.

Over the past several years, many have made attempts to redesign one or both of the general and organic chemistry sequences, yet for the most part they have remained relatively unchanged. Is there a need to rethink the first two years of college chemistry or should things continue as is?

OR

Collins 290 **Technology and chemical education – what are you doing?** Moderator: Riham Mahfouz, Insturctor, Thomas Nelson Community College, Hampton, VA.

Keeping with the conference theme, this session aims to give participants the opportunity to share some of their successes and hurdles as they try to incorporate current and emerging technologies into both online and traditional coursework.

12:00 – 1:00 Phillips 307, 308, & 309 **Lunch**

Session VII – Workshops

1:00 – 2:45 Collins 258 **Hands-On Experiments with MicroLab: Concepts we can learn with high resolution measurements and MicroLab's FASTspec 16-wavelength scanning spectrophotometer**; Dr. John R. Amend, Professor of Chemistry, Emeritus, Montana State University, Bozeman, MT, and President, MicroLab, Inc., Bozeman, MT

Hands-On Experiments with MicroLab: Calibrating sensors; Freezing points and fractional distillation; Real-time acid-base titrations: end points, derivatives, and pKa; and Color, Beer's Law, and Fluorescence with MicroLab's ***FASTspec*** 16-wavelength scanning spectrophotometer.

OR

Collins 209 (Computer) **Discover the JCE DLib and the ChemEd DL: Digital Resources for the Chemistry Educator**; Linda Fanis, Assistant Editor, Journal of Chemical Education, Madison, W.

Interested in using digital resources in your classroom? Explore the multitude of resources found at the *JCE* DLib in this hands-on guided inquiry workshop. Get a head start on searching and using *JCE* content that will soon to be part of the ChemEd DL, a Pathway project of the National Science Digital Library. Ultimately, the ChemEd DL will be the destination for digital content intended for chemical sciences education. It will become the place where you can contribute, share, and organize chemistry education materials. The workshop is run through Moodle, a free, open source course management system for online learning, which will allow you to work through tutorials with supplemental presentations to enhance your learning.

Session VIII – Presentations

1:00 – 1:45
Collins 286

From Formula To Structure: Drawing the structure of molecules from their formulas using off-the-shelf molecular drawing programs., Dr. Barry Miburo, Associate Professor of Chemistry, Abraham Baldwin Agricultural College, Tifton, GA

How much structural information does the ordinary student draw from the formula of an inorganic molecule? The quick answer is NONE. The obvious reason is that the formula provides only information about the composition, not the structure of a molecule. However, coupled with the oxidation numbers of the atoms of molecules, and some conventions on how to express graphically those oxidation numbers, formulas can provide vital information on the structure of molecules. In this presentation, icons from ISIS DRAW molecular drawing program are adapted and used in conjunction with oxidation numbers of the atoms of inorganic molecules to connect their formulas to their corresponding structures. This is done by students in their second week of first semester General Chemistry class.

2:00 – 2:45
Collins 290

The Quest for an Effective Hybrid Introductory Chemistry Course; Dr. Margaret (Peggy) Geiger, Instructor, Gaston College, Dallas, NC

Initial offerings of hybrid introductory chemistry were offered with seated labs (face to face) and online lectures. A high student withdrawal rate was consistent with students expressing a high degree of frustration with the online lecture. Final exam grades were lower than those in prior seated course sections. The hybrid introductory chemistry course (the first semester of the two semester General, Organic, and Biochemistry sequence) was revised in spring 2006 to include both hybrid lecture and hybrid lab. The online portion of the lab used Late Nite Labs chemistry lab simulation software. The revised format resulted in increased student retention, but had little effect on final exam grades. Student opinion of the revised course format and the Late Nite Labs software is generally favorable

3:00 – 3:45
Collins 278
(Auditorium)

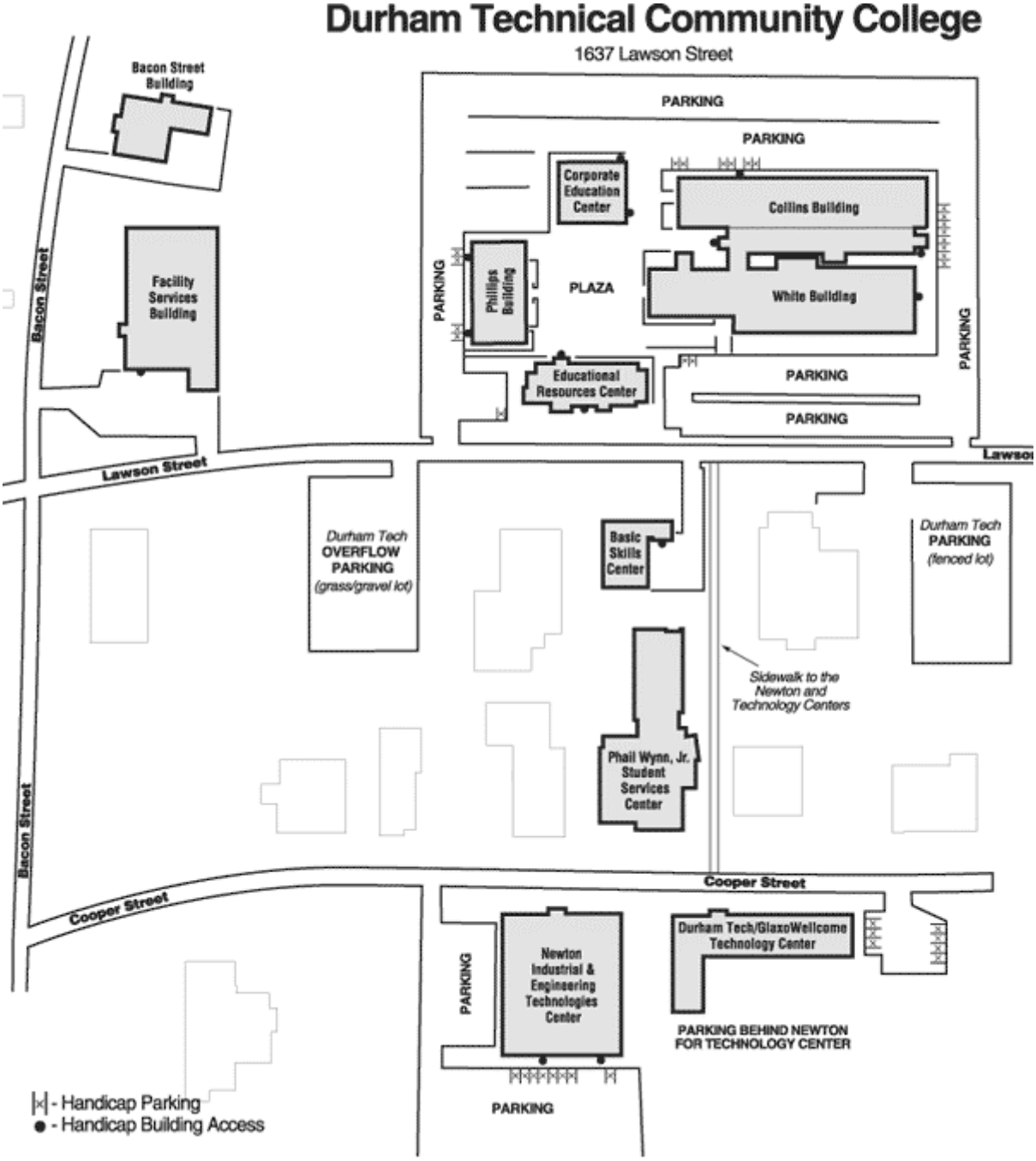
Sage on the Stage or Monkey in the Middle. How to go from lecturing to your class to learning with them; Tracy Miller Cheatham, Instructor, Central Carolina Community College, Sanford, NC

Active learning is an umbrella term that can encompass many different types of activities. All involve active student participation. The current trend is toward a student-centered learning environment as opposed to an instructor-centered environment. Sharing and discovering some active learning strategies can change your classroom from a lecture based environment to one where students are actively involved. It also can be a powerful tool for immediate feedback.

4:00 – 4:30
Collins 278
(Auditorium)

Conference Closing

INSERT COLLINS MAP


Durham Technical Community College
1637 Lawson Street
Bacon Street Building
Facility Services Building
Bacon Street
Lawson Street
PARKING
PARKING
Corporate Education Center
Collins Building
PARKING
Phillips Building
PLAZA
White Building
PARKING
Educational Resources Center
PARKING
PARKING
Durham Tech OVERFLOW PARKING (grass/gravel lot)
Basic Skills Center
Durham Tech PARKING (fenced lot)
Sidewalk to the Newton and Technology Centers
Phail Wynn, Jr. Student Services Center
Bacon Street
Cooper Street
Cooper Street
PARKING
Newton Industrial & Engineering Technologies Center
Durham Tech/GlaxoWellcome Technology Center
PARKING BEHIND NEWTON FOR TECHNOLOGY CENTER
PARKING
- Handicap Parking
- Handicap Building Access