# Charles T. Cox Jr.

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## Work Experience

### Stanford University, Department of Chemistry

**333 Campus Drive**
**205 Sapp Center for Teaching and Learning**
**Stanford, CA 94305**
**Full Time Lecturer and Administrator, 2010 – present**
**Coordinator for Undergraduate Laboratory Safety**

- Develop new innovative laboratories for general, organic, and analytical chemistry.
- Teach advanced general chemistry, biochemistry, organic, and analytical lecture and laboratory
- Develop, facilitate, and assess TA training (teaching, policies, and safety) for all incoming graduate students and assist with the TA mentoring program.
- Prepare peer review modules for analytical chemistry (the writing in the major course)
- Conduct and publish chemical education research focusing upon problem solving strategies, writing and peer-review, case-based learning, undergraduate laboratory experiences at the research interface, and active learning methodologies.
- Prepare internal grant proposals for university funding to support education-based research projects
- Advise the Alpha Chi Sigma (AXS) chemistry social organization at Stanford University
- Coordinate with instrumental facilities for GC, HPLC, MS, ICP, x-ray, and NMR analyses. Oversee the budget and usage of these instruments for my courses.
- Develop and facilitate safety training for chemistry and biology undergraduate students enrolled in laboratories.
- Implement the safety policies for the biology and chemistry laboratories and advise other departments upon safety training standards and laboratory policies.
- Partially manage the laboratory budget and undergraduate budget for TA training.
- Interface with EH&S for compliance issues.
- Develop evidence-based research methods for assessing curriculum changes and student trajectories in major and service courses.

- Assist with outreach events which have included demonstrations and presentations for local high school students.
- Wrote and continually update the textbook used in the advanced general chemistry course at Stanford.
- Develop case-studies for active learning modules in an upper-division biochemistry course.
- Co-teach and assist with the science curriculum for the Leland Scholars Program -- designed for incoming freshmen who attended under-resource high schools.
- Prepare videos and screencasts (using Camtasia) for implementing a flipped classroom approach for general and biochemistry.
- Incorpoate MatLab into analytical chemistry and PyMol into biochemistry.
- Serve as an academic advisor for chemistry majors and nonmajors.

**Santa Clara University**
**Part-time Lab Lecturer, 2013 – 2016**
Taught Chem 31L, 32L, and 33L (the labs the accompany the organic chemistry curriculum).

**Georgia Institute of Technology**
**801 Atlantic Drive,**
**Atlanta, GA 30332**
**Academic Professional, Assistant Director of General Chemistry 2007 - 2010**

- Coordinated TA training and faculty professional development.
- Developed new laboratories for general and inorganic chemistry using cooperative learning and inquiry methods.
- Incorporated a new paradigm for recitation based upon cooperative learning.
- Taught general or inorganic chemistry each term.
- Coordinated the honors laboratory.
- Developed new special topics courses related to chemical education and supramolecular chemistry.
- Facilitated training of TAs with regard to using cooperative learning and inquiry.
- Served as an academic advisor for approximately 30 to 40 chemistry and biochemistry undergraduate students.
- Mentored undergraduate students in chemical education and green chemistry research for credit.
- Managed the electronic homework assignments (WebAssign and Eduspace) for the 2000 students enrolled in general chemistry during the fall semester and the 400 students during the spring semester.

- Provided assistance to individual instructors as needed: demonstration development, substitute teaching, exam construction, lecture development, and assistance with technology (personal response systems and computer-based animations).
- Promoted the enhancement of scientific writing throughout the chemistry curriculum using technology and in-lab methods such as peer editing or the use of calibrated peer review with regard to technology.
- Collaborated with the Center for Enhancement of Teaching and Learning on related programs and research projects.

**Lecturer, University of New Hampshire, Durham (Main Campus) 2006- 2007**
**23 College Ave.**
**Durham, NH 03824**

- Taught two large enrollment general chemistry courses (approximately 220 students in each course).
- Taught the one semester sequence of organic chemistry with 40 students during the summer term.
- Coordinated the organic laboratories during the summer term which included TA supervision, training, and mentoring.
- Assisted with PLTL implementation and leader training.
- Incorporated computer-based assignments within the course including calibrated-peer review, chem. skills builder, and IMMEX.
- Assisted with the coordination of the honors and majors' laboratories.
- Mentored seven students for undergraduate research in the following areas.
    - HPLC method development
    - Development of Case-Based Lecture Modules
    - Development of Case-Based Assessments
    - Dissemination of the calibrated-peer review results
    - Analysis of attitude inventories.
- Incorporated a new paradigm for a review session known as the GIG model (Group-Intervention-Group) model that incorporates cooperative learning while still placing more responsibility on the students.

## Education

**Clemson University (Ph.D. Chemistry, Minor Experimental Statistics)**
August 12, 2006
Dissertation Title: "An Investigation of the Effects of Interventions on Problem Solving Strategies and Abilities"
Coursework GPA: 4.0/4.0

**North Carolina State University (B.S. Chemistry, Minor Mathematics)**
December 2001
Graduate Summa Cum Laude, GPA: 4.0/4.0

## Research

**Stanford University (2010 – present)**

1. Developed new calibrated peer review assignments for incorporation in general, organic, and analytical chemistry courses.
2. Developed and administered students interviews to measure the efficacy of CPR in the classroom. Developed, implemented, and published a variation of CPR for general chemistry homework.
3. Interfaced with research groups to incorporate laboratory experiments based upon cutting edge research. This included C-H insertion reactions and a partial synthesis of tetrodoxin.
4. Assessed student understanding of organic principles applied to biochemistry molecules, and designed interventions to aid in increasing understanding and performance.
5. Research, develop, and assess best practices for TA training (teaching and safety).

**University of New Hampshire, Chemical Education, Prof. Christopher Bauer (Postdoc); 2006-2007**

1. Implemented the GALT test to gauge students' scientific aptitude. This served as a comparison with performance on Calibrated Peer Review (CPR) assignments.
2. Studied the relationship between performance on CPR assignments and gender.
3. Developed a series of case-based problems incorporating topics from biology, physics, and engineering.

**Clemson University, Chemical Education, Prof. Melanie Cooper (Advisor); 2003 - 2006**
**University of California-Los Angeles, Prof. Ron Stevens (Collaborator)**

1. Developed a suite of organic case-based IMMEX problems covering topics including stereochemistry, mechanisms, synthesis, spectroscopy, and qualitative analysis
2. Used the data mining features of IMMEX for the development and implementation of problem solving interventions such as concept mapping, peer led team learning, and collaborative grouping.
3. Analyzed performances using data mining tools including artificial neural networks for analysis of strategies at a given point in time, hidden Markov models for analysis of strategies of a specific time interval, and item response theory for a performance

analysis using a criterion based reference
4. Implemented IMMEX technology across the general and organic chemistry curricula at Clemson University which included approximately 2500 students

**Clemson University, Organic Chemistry, Prof. Luis Echegoyen; 2002 - 2003**
1. Prepared fullerene ($C_{60}$ and $C_{70}$) derivatives using the Bingel, Prato, and Diels-Alder protocols
2. Characterized derivatives using traditional methods (NMR, IR, UV/Vis, TLC) and cyclic voltammetry
3. Studied the mechanism of the retro-Bingel reaction (an electrochemically driven process using bulk electrolysis and EPR
4. Prepared and implemented an advanced organic laboratory experiment that was accepted for publication in the *Journal of Chemical Education* using this research

**North Carolina State University (Undergraduate Research), Prof. Stefan Franzen; 2001**
1. Developed methods using Differential Scanning Calorimetry to study protein folding behavior.
2. Attached ligands to horse heart myoglobin to determine the effect on the folding temperature (it was observed to increase).

**North Carolina State University (Undergraduate Research), Prof. Maria Oliver-Hoyo; 2001**
1. Prepared curriculum materials for the SCALE-UP general chemistry course at NCSU. The SCALE-UP course combines lecture and laboratory into a single block.
2. Assisted with the development of olfactory titrations for visually impaired individuals.

# Teaching

## *Stanford University*

***CHEM 36, Organic Chemistry Laboratory I, Autumn 2010***

The first course in a two-course sequence that focuses upon development and utilization of important organic techniques including spectroscopy and chromatography. Experiments included the Knoevenagle synthesis, the Robinson annulation, competition between substitution and elimination, esterification, a Grignard synthesis, dehydration of cyclohexanol with GC analysis of the products, and a green oxidation.

***CHEM 132, Synthesis Laboratory, Winter 2011-2015***

The advanced synthesis course for chemistry majors that focuses upon organometallics and advanced technique including 2D NMR and GC/MS. This course also requires an independent research project that involves the preparation of a proposal and a presentation to faculty. Experiment topics include the Jacobsen catalyst, a multicomponent synthesis, porphyrin synthesis and purification, C-H insertion using a Rhodium catalyst, analysis of a paramagnetic product using the Evans NMR method, and sigmatropic reactions.

***CHEM 134, Analytical Chemistry, Spring 2011-2017***

This is the writing in the major course that emphasizes the development of scientific writing skills including preparation of lab reports, data presentation, literature searching, and referencing. The lecture component emphasizes statistics, sampling, sample preparation, chromatography, spectroscopy, and electrophoresis. The course carries the most credit of Stanford chemistry courses. The course is co-taught with Prof. Hongjie Dai or Prof. Dick Zare.

***CHEM 135, Physical Biochemistry, Winter 2016***

This course is designed to provide an overview of the laws of thermodynamics and kinetics using calculus for bioscience students. The course was co-taught with Prof. Bob Pecora.

***CHEM 141, The Molecules of Life I, Winter 2017***

This course is designed to service non-chemistry majors that require biochemistry. The course uses a case-based approach to analyze biomolecules and pathways with the lens of chemistry. The topics include protein structure and function, enzyme-kinetics, glucose metabolism, lipids, membranes, and the electron transport chain. The course was co-taught with Prof. Du Bois and Prof. Khosla.

***CHEM 31X, Advanced General Chemistry, Summer 2011, Fall 2011-2016***

This is the advanced general chemistry course designed for students having a strong chemistry background. Most students in this course typically have a 5 on the AP exam. The course is designed to cover all of the major topics of general chemistry in 10 weeks with a strong emphasis on acid-base chemistry and structure. This course was co-taught with Prof. Mike Fayer, Prof. Dick Zare, or Prof. W.E. Moerner each quarter. I implemented a new laboratory component initially in the fall of 2012, and completed the roll out in the fall of 2013 with 10 new laboratory experiments.

***CHEM 34XN, General Chem. Laboratory Seminar, Fall 2011 and Fall 2012***
The major focus of this course was upon renewable energy resources. The course included the synthesis of Trisbipyridine ruthenium (II) chloride followed by purification, analysis, and development of a solar cell.

***CHEM 1 (33 in the Academic Year), Structure and Reactivity of Organic Molecules, Summer 2016 – 2017***
Structure and reactivity of organic molecules. The course emphasizes conformational analysis, stereochemistry, substitution, elimination, and addition reactions with an emphasis upon the kinetic and thermodynamics of each reaction.

***CHEM 3 (131 in the Academic Year), Polyfunctional Organic Molecules, Summer 2012***
The major topics included conjugated dienes, aromatics, heterocycles, carbohydrates, and amino acids. There was a strong emphasis upon aromatic reactions, mechanisms, and synthesis.

***CHEM 31A, Chemical Principles I, Summer 2012, Summer 2013***
This serves as the introductory general chemistry course and includes stoichiometry, thermochemistry, gas laws, quantum, and bonding.

***CHEM 10, Problem Solving in Science (LSP), Summer 2013-2016***
This course was designed to cover problem solving in science with a strong emphasis upon stoichiometry and building math skills. The course was designed for students from less resourced high schools and served to provide an introduction to Stanford university. The problem solving was taught using chemistry in context.

***CHEM 1L, 2L, 3L, Organic Chemistry Laboratory, Summer 2014-2016***
This course is the summer organic chemistry laboratory sequence covering techniques and spectroscopic methods. The laboratory experiments include: enantiomer separation and polarimetry analysis, distillation, Diels-Alder, Aldol, Grignard, reduction and oxidation reactions, and polymers.

*Summary of Course – Evaluation Metrics*

| Quarter | Course | Co-Instructor | Course Quality [1] (out of 5) | Instructor Quality (out of 5) | Number of Students |
|---|---|---|---|---|---|
| S 2016 | 134-Analytical | Dai | N/A | 4.80 | 21 |
| W 2016 | 135-Physical Biochem. | Pecora | N/A | 4.57 | 134 |

| | | | | | |
|---|---|---|---|---|---|
| F 2015 | 31X-Adv. Gen. Chem | Zare | N/A | 4.1 | 196 |
| S 2015 | 134-Analytical | Dai | 4.52 | 4.81 | 21 |
| W 2015 | 132-Synthesis Lab | | 4.61 | 4.72 | 19 |
| F 2014 | 31X-Adv. Gen. Chem | Zare | 4.17 | 4.59 | 135 |
| S 2014 | 134-Analytical | Zare | 3.92 | 4.50 | 13 |
| W 2014 | 132-Synthesis Lab | | 4.73 | 4.73 | 15 |
| F 2013 | 31X-Adv. Gen. Chem | Zare | 4.12 | 4.47 | 171 |
| S 2013 | 134-Analytical | Zare | 3.00 | 3.65 | 22 |
| W 2013 | 132-Synthesis Lab | | 4.40 | 4.27 | 21 |
| F 2012 | 31X-Adv. Gen. Chem | Zare | 3.85 | 4.33 | 273 |
| F 2012 | 34X-Lab Seminar | | 4.56 | 4.44 | 10 |
| S 2012 | 134-Analytical | | 3.1 | 3.2 | 16 |
| W 2012 | 132-Synthesis Lab | | 4.25 | 4.15 | 23 |
| F 2011 | 34X-Lab Seminar | | 4.25 | 4.50 | 11 |
| F 2011 | 31X-Adv. Gen. Chem | Fayer | 3.95 | 3.90 | 248 |
| S 2011 | 134-Analytical | | 3.33 | 3.48 | 39 |
| W 2011 | 132-Synthesis Lab | | 4.20 | 4.00 | 19 |
| F 2010 | 36-Organic Chem Lab | | 4.10 | 4.25 | 132 |

[1]The new evaluations starting in F2015 were updated and the quality of the course was not included as a metric.

## *Georgia Institute of Technology*

### *CETL 8803, Princ. of Teaching and Learning Chemistry, Graduate Credit, Spring 2008*

1. Designed this new special topics course for graduate students interested in teaching after finishing their program.
2. Discussed the cognitive aspects of learning chemistry using articles from the *Journal of Chemical Education*, *The Chemical Educator,* and other pertinent journals.
3. Provided an in-depth discussion of several pedagogical methods including: the use of demonstrations, the role of analogies, small group learning, concept mapping, peer-led team learning, and molecular modeling and visualizations. The relationship with the cognitive aspects of these methods was emphasized during these discussions.

### *CHEM 1310, General Chemistry, Spring, Summer, and Fall 2008*

1. Taught the accelerated calculus-based general chemistry sequence with an enrollment of approximately 200 students.
2. Collaborated with the lab coordinator for the development of a new laboratory manual that closely correlates with the lecture component, as well as, utilizes active-learning methods such as inquiry and cooperative learning.

3. Implemented a new recitation model known as the GIG model (for Group-Individual-Group) which is a variation of PLTL and cooperative learning with a stronger individual emphasis. The model requires students to complete a weekly assignment in a group of three or four (35 minutes) which is followed up with an individual assignment consisting of two or three problems. During the following recitation, students are required to develop a consensus regarding the answers before submitting their final assignment (15 minutes). The teaching assistants were trained to act as a facilitator in lieu of an instructor for this model. A statistical difference was observed which the treatment group earning higher marks on the common exam questions in comparison to the control group which received a teaching-based TA driven recitation.
4. Incorporated microteaching within the weekly TA meetings. Each teaching assistant was assigned a specific lab in which they were required to prepare a pre-lab lecture to present to their peers. This lecture was videotaped and formative feedback was provided. Furthermore, the instructor was provided with a copy of the videotape and was required to complete a self-assessment evaluation.
5. Assisted with the evaluation of the TA performance and abilities during the semester.

***CHEM 4311, Advanced Organic Chemistry, Fall 2009 (Taught Jointly with Dr. Uwe Bunz)***

1. Provided an in-depth overview of advanced organic chemistry principles including mechanisms and synthetic methodology.
2. Emphasized applications of organic molecules with a particular emphasis on supramolecular chemistry in particular porphyrin, CTVs, and fullerenes.
3. Introduced heterocyclic compounds with an emphasis on structure, function, and synthesis.
4. Approached topics from a physical organic standpoint.
   (Graduate/Undergraduate Course)

***CHEM 1311, Inorganic Chemistry Summer 2009, Spring 2010, Summer 2010***

1. Taught the fundamental theories of molecular orbital theory and quantum theory.
2. Reviewed and presented a more in-depth overview of periodic trends.
3. Introduced hard soft acid-base chemistry.
4. Provided a brief overview of electrochemistry including cell design and incorporated Latimer diagrams within this discussion.
5. Emphasized the properties and reactivity of inorganic elements.
6. Introduced magnetic and optical properties with regard inorganic compounds.

7. Concluded with a discussion of bioinorganic materials.

***CETL 8000, TA Training and Preparation, Fall 2007***

1. Created a discussion oriented class to provide teaching assistants with information about their job duties and the importance of being a good teaching assistant especially large enrollment classes.
2. Discussed learning styles and incorporated various activities to demonstrate the variance in learning styles among an audience of 45 students.
3. Provided an overview of different pedagogical methods such as concept mapping, collaborative learning, and emphasized the significance of active learning.
4. Described various assessment methods and provided pertinent information regarding the department's expectations and guidelines with regard to assessment.
5. Emphasized the role of safety which included a discussion of appropriate safety measures.

*Summary of Course – Evaluation Metrics*

| Quarter | Course | Instructor Effectiveness | Number of Students |
|---|---|---|---|
| Sum 2010 | 1311 (Inorganic) | 5.0 | 50 |
| Spr. 2010 | 1311 (Inorganic) | 4.8 | 200 |
| Fall 2009 | 4311 (Adv. Organic) | 4.5 | 15 |
| Fall 2009 | 1310 (Gen. Chem) | 4.9 | 196 |
| Sum 2009 | 1311 (Inorganic) | 4.8 | 40 |
| Spr 2009 | 1310 (Gen. Chem) | 4.4 | 196 |
| Fall 2008 | 4311 (Adv. Organic) | 4.3 | 12 |
| Fall 2008 | 1310 (Gen. Chem) | 4.8 | 200 |
| Sum 2008 | 1310 (Gen. Chem) | 4.5 | 40 |
| Spr 2008 | 1310 (Gen. Chem) | 4.7 | 173 |

## *University of New Hampshire*

***Organic Chemistry (One Semester Sequence), Summer 2007***

1. Prepared lectures and course materials.
2. Taught the accelerated 6-week session with approximately 40 students.
3. Coordinated the associated laboratory and assisted with TA training.

***General Chemistry Sequence, Aug 2006 – May 2007***

1. Prepared lectures and course materials for the general chemistry sequence.

2. Taught two large enrollment sections with approximately 200 students in each section.
3. Implemented Chem Skills Builder and Calibrated Peer Review assignments.

## *Clemson University (as a Teaching Assistant)*

***Organic Chemistry Laboratory, Clemson University Laboratory Coordinator, Summer 2006***

1. Assisted with teaching assistant training and preparation.
2. Prepared the syllabus and course materials for the laboratory.
3. Implemented cooperative learning and POGIL exercises in the laboratory.

***Organic Laboratory, Jan. 2003 – May 2006***

1. Prepared and graded assignments including homework, quizzes, and a final exam.
2. Implemented cooperative learning experiments in the laboratory which were designed to give students a project based laboratory experience
3. Taught techniques and associated concepts for each experiment
4. Assisted students with concepts taught in the lecture portion of the course

***Teaching Chemistry, Clemson University, Aug – Dec. 2004***

This is a senior level chemistry course designed to provide students with an overview of the topics related to teaching chemistry including pedagogical methods and research in the areas of learning and cognition

1. Assisted Prof. Melanie Cooper with the instruction and grading in this course which had an enrollment of 25 students
2. Prepared assignments including a digital portfolio assignment requiring students to submit essays, links, and commentaries on various topics pertaining to teaching chemistry and chemical education research and practice
3. Facilitated class discussions
4. Assisted with the implementation of class projects and demonstrations

***General Chemistry Lab, Clemson University, Jan – May 2002***

This is a cooperative laboratory with project-based experiments. Students are responsible for developing their own procedures. Major experiments included synthesis and analysis of Soap from various staring materials, calorimetry, and electrochemistry.

***Chemistry Orientation, Aug. 2005 – Dec. 2005***
The objectives of this course are to introduce students to chemistry at Clemson University and to introduce students to the life of a chemist. The course includes discussions of the various career opportunities in chemistry, as well as, a project focusing on one issue (such as limited fossil fuels) that will ultimately be solved by chemistry. Approximately 25 students were enrolled in the course.

## Grants

**Stanford University**
Development of a New Active Learning Biochemistry Curriculum
$250,000.00

**Hoagland Fellowship**
*Incorporating Writing Assignments Across the Chemistry Curriculum Using Calibrated Peer Review, Stanford University*
$30,000.00

**Georgia Tech Foundation; August 2007**
*"The Enhancement of Laboratory Instruction Using Technology"*
$55,800
This grant provided each lab with a tablet PC for instruction and a server to host videos demonstrating appropriate laboratory techniques.

**Center for the Enhancement of Teaching and Learning Mini-Grant (Georgia Tech Foundation); July 2007**

*"The Incorporation of Microteaching Activities for Chemistry Teaching Assistant Training"*

$1,000

## Committees

Peer Reviewer for the Journal of College Science Teaching
Peer Reviewer for the Journal of Chemical Education
Safety Committee at Stanford University
International Activities Committee (IAC) for the American Chemical Society.

ACS Exams Institute (DUCK – 17)

Santa Clara Valley ACS (Councilor, elected position)

**American Educational Research Association**
Committee Co-Chair with Dr. Melanie Cooper, Division C Science and Learning
2007 National Meeting of the AERA, Chicago, IL.
Session Chair for the program entitled "Physical Science Education."

## Publications & Talks

**Course Materials**

**1.** Bottomley, L., and Cox, C.T. Chemistry 1310: General Chemistry, Laboratory Manual, Hayden-McNeil Publishing, **2008.**

**2**. Bottomley, L., and Cox, C.T. Chemistry 1312: Introduction to Inorganic Chemistry, Laboratory Manual, Hayden-McNeil Publishing, **2008**.

**Papers**

**1.** Herranz, M.; Cox, Jr., C.T.; Echegoyen, L. Retrocyclcopropanation Reactions of Fullerenes: Complete Product Analysis, *J. Org. Chem.,* **2003**, 68, 5009.

**2.** Ortiz, J.; Fernandex-Lazaro, F.; Sastre-Santos, A.; Quintana, J.; Villvilla, J.; Boj, P.; Diaz-Garcia, A; Rivera, J.; Stepleton, S.; Cox, Jr., C.T.; Echegoyen, L., Synthesis and Electrochemical and Photorefractive Properties of new Trinitrofluorenone-C60 Photosensitizers, *Chem. Mater.,* **2004**, 16, 5021.

**3.** Stevens, R,; Soller, A.; Giordani, A.; Generosa, L.; Cooper, M.M., Cox, C., Developing a Framework for Integrating Prior Problem Solving and Knowledge Sharing Histories of a Group to Predict Future Group Performance, *Proceedings of Collaborate Com 2005: The First International Conference on Collaborative Computing: Networking, Applications and Worksharing,* December **2005**

**4.** Cox, Jr., C.T.; Cooper, M.M., Derivatization of Fullerenes: An Organic Laboratory, *J. Chem. Educ.,* **2006**, 99.

**5.** Cox, Jr., C.T.; Jordan, J.; Cooper, M.M., Stevens, R., Assessing Student Understanding with Technology: The Use of IMMEX Problems in the Science

Classroom, *The Science Teacher*, **2006**, 73, 56.

**6**. Cooper, M.M., Cox, Jr., C.T.; Nammouz, M.; Stevens, R. Improving Problem Solving with Simple Interventions, *New Directions*, **2007**, 3, 64.

7. Cox, Jr., C.T. et. al. *Advancements in curriculum and assessment by the use of IMMEX technology in the organic laboratory*, *Chem. Educ. Res. Pract.*, **2008**, 9, 25–34

**8.** Cooper, M.M.; Cox, Jr., C.T.; Nammouz, M.; Case, E. *J. Chem. Educ.*, **2008,** 6, 85.

**9.** Cox Jr., C.T., *Incorporating More Individual Accountability into Group Activities in General Chemistry*, J. Col. Sci. Teach., 43, **2015**, 26 – 32.

**10**. Zare, R.N., Cox, Jr., C.T., Murphy, K., Bayas, C. *Implementation of Peer-Reviewed Homework Assignments,* J. Col. Sci. Teach, **2017**.

**Talks**

**1.** Cooper, M.M; Case, E.; Cox, C.; Stevens, R., *Technology based assessments in chemistry*, Proceedings of the 227th National Meeting of the American Chemical Society, Anaheim, CA; March, **2004**.

**2.** Cox, Jr., C.T.; Cooper, M.M; Stevens, R. *Analysis of problem solving strategies for qualitative organic analysis problems using web-based software (IMMEX);* Proceedings of the 18th Biennial Chemical Education Meeting, Ames, IA; July, **2004**.

**3**. Cox, Jr., C.T.; Cooper, M.M, *Derivatization of Fullerenes: An Organic Chemistry Laboratory*; Proceedings of the 18th Biennial Chemical Education Meeting, Ames, IA; July, **2004**.

**4.** Cooper, M.M.; Cox, Jr., C.T.; Nammouz, M.; Stevens, R., *Probabilities and predictions: Modeling the development of scientific competence*; Proceedings of the 228th National Meeting of the American Chemical Society, Philadelphia, PA; Aug., **2004**

**5.** Cox, Jr., C.T.; Cooper, M.M., Fecteau, M.; Stevens, R., *Lewis structures: An interactive multimedia exercise for general and introductory organic chemistry*, Proceedings of the 228th National Meeting of the American Chemical Society, Philadelphia, PA; Aug., **2004**

**6.** Cox, Jr., C.T.; Cooper, M.M.; Pease, R..; Buchanan, K.; Stevens, R., *IMMEX: An Alternative to Laboratory Examinations*; Proceedings of the 56th Southeastern Regional American Chemical Society Meeting, Durham, NC; November, **2004**.

**7.** Cox, Jr., C.T.; Cooper, M.M.; Stevens, R., *Multiple Layers of Assessment of IMMEX Software*; Proceedings of the 16th International Conference on College Teaching and Learning, Jacksonville, FL; March **2005**.

**8**. Cox, Jr., C.T; Cooper, M.M.; Stevens, R.; *Use of IMMEX in the Chemistry Classroom, Workshop*, ChemEd 2005, Vancouver, BC. **2005**.

**9.** Cox, Jr., C.T.; Cooper, M.M.; Stevens, R.; *Use of Concept Maps and Collaborative Grouping for Problem Solving Interventions, Proceedings of the Gordon Research Conference*, New London, Connecticut, June **2005**

**10.** Cox, Jr., C.T.; Cooper, M.M.; Giordani, A.; Generosa, L.; Soller, A.; Stevens, R.., *Online collaborative interventions for an organic stereochemistry problem.* Proceedings of the 230th National Meeting of the American Chemical Society, Washington, DC; Aug. **2005**.

**11.** Cox, Jr., C.T.; Cooper, M.M., Lewis, B., *Peer – Led Team Learning (PLTL) as an Approach for Improving Performance in General Chemistry*, Scholarship of Teaching and Learning Faire, Cullowhee, NC, Feb. **2006**.

**12**. McAlister, T.; Cooper, M.M., Cox, Jr., C.T.; Stevens, R., *Probing the difficulties of Stoichiometry,* 231st National Meeting of the American Chemical Society, Atlanta, GA; Mar. 2006.

**13.** Cox, Jr., C.T.; Cooper, M.M., Nammouz, M.; Stevens, R., *Use of the GALT Test for Gauging the Effect of Group Composition on Collaborative Problem Solving Interventions,* 231st National Meeting of the American Chemistry, Atlanta, GA; Mar. **2006**.

**13.** Bull, B.; Cox, Jr. C.T.; Cooper, M.M.; Stevens, R., *No Butts About It: A Lab-IMMEX Problem,* Proceedings of the Southeast Undergraduate Research Conference, Atlanta, GA; Mar. **2006.**

**15.** Cox, Jr. C.T.; Cooper, M.M.; Stevens R.; *Use of Concept Maps and Collaborative Grouping for Problem Solving Interventions,* Proceedings from the 19th Biennial Conference on Chemical Education, West Lafayette, IN; July **2006**.

**16.** Cox, Jr. C.T; Cooper, M.M.; Stevens, R.; *Strategy Stabilization: A Study of Factors Affecting Student Strategies Using IMMEX Software*, Proceedings from the 19th Biennial Conference on Chemical Education, West Lafayette, IN; Aug. **2006**.

**17.** Cooper, M.M.; Cox, Jr., C.T.; Lewis, B.L.; *The role of PLTL in improving the outcomes for a large enrollment general chemistry course,* 232nd National Meeting of the American Chemical Society, San Francisco, CA; Sept., **2006**.

**18.** Cox, Jr. C.T.;Vandeventer, S.; Bungert, A.; Beninati, C.; *The Development of Case-Based Scenarios for an Integrated Chemistry, Biology, and Physics Classroom*, Proceedings from Chem Ed 2007, University of North Texas, **2007.**

**19.** Cox, Jr., C.T.; Ta, F.; Towne, R.; *The Use of the G-I-G Model as a Variation of Cooperative Learning to Improve Student Problem Solving*, Proceedings from Chem Ed 2007, University of North Texas, **2007.**

**20.** Cox, Jr., C.T.; Vandeventer, S.; Shahbazian, C.; Dickson, A.; Beninati, C.; *Using case-based problems to promote problem solving and retention in general chemistry.* Proceedings from the 20th BCCE Conference, Bloomington, Indiana (Indiana University), 29 July **2008**.

**21.** Gaitlin, T.; Cooper, M.; Cox, Jr., C.T.; Pienta, N.; Underwood, S.; *Assessing the cognitive and visualization skills necessary for understanding and use of chemical structures*, Proceedings from the 20th BCCE Conference, Bloomington, Indiana (Indiana University), 27 July **2008**.

**22.** Cox, Jr., C.T.; Kilner, C.W,; *The Chem-Math Teaching Paradigm at the University of New Hampshire,* Proceedings from the 20th BCCE Conference, Bloomington, Indiana (Indiana University), 29 July **2008**.

**23.** Cox, Jr. *Designing a New Framework for Teaching Scientific Writing within Analytical Chemistry,* Proceedings from the 242nd meeting of the American Chemical Society, Denver, CO, 30 Aug. **2011**

**24.** Schwartz, J.; Cox, Jr., C.T.; Ortega, C.; Barefield, D.; *Introducing Stanford Freshman to Science Writing Through Calibrated Peer Review*, Proceedings from the 22nd BCCE Conference, State College, PA, 31 July **2012**

**25.** Cox, Jr., Schwartz, J.; Ortega, C.; Barefield, D.; *Promoting Writing in the Upper Division Curriculum at Stanford University using Calibrated Peer Review*, Proceedings from the 22nd BCCE Conference, State College, PA, 31 July **2012.**

**26.** Cox, Jr.; C.T. et al. *Writing and knowledge retention in general chemistry: Does a correlation exist?* Proceedings of the 246th meeting of the American Chemical Society, Indianapolis, IN, 9 Sep. **2013.**

**27.** Cox, Jr.; C.T. et al, *Bridging the gap between research and teaching: A C-H insertion project*
Proceedings of the 246th meeting of the American Chemical Society, Indianapolis, IN, 10 Sep. **2013.**

**28.** Cox, Jr. C.T. et al. *Modern C-H Oxidation Catalysis as an Advanced Organic Chemistry Lab*, Proceedings of the 248th meeting of the American Chemical Society, San Francisco, CA, 10 Aug. **2014**.

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