

CU Teach gains momentum

Students discover they have found their niche: teaching

by Barbara Darling
Director of Communications
and Alumni Relations

When CU-Boulder undergraduates get their first taste of teaching in an elementary school classroom, the encounter is often life changing. Previous dreams of a career in medicine or engineering vanish as the lure of having such a dramatic impact on children takes hold. Many students discover they have found their niche: teaching.

"They're really experiencing a brief moment of a teacher's life and how cool and challenging it is," said Julie Andrew, a former chemistry teacher and now a Master Teacher in the CU Teach program.

For Master Teacher and former mathematics teacher Kim Bunning, watching the transformation in students is inspiring as she sees them appreciate mathematics from a new perspective. "I love the moments when they know, 'This is it.' When students have these ah-ha moments, it is usually when they really understand mathematics. So often they say, 'I never understood that before. I want my students to know math like this.'" And, thus, a passion for teaching is born.

It certainly helps the CU Teach program that its Master Teachers in the School of Education exude enthusiasm for the teaching profession—as well as the subjects CU Teach enrollees gain more expertise in—math and science.

"I love chemistry," said Andrew. "When I went to college and took my first chemistry course, I realized that chemistry is part of how we exist. It's the most creative endeavor. I think about something in a big way and wonder, why is that working—why can mortar and cement cure under water, for instance? I think it's just amazing."

For Bunning, mathematics rules! "I think I like that math is such a powerful tool for viewing phenomena in the world—why do things work the way they do? So much can be explained through mathematics. I feel like I have some control in the world around me because mathematics provides a bit of deeper understanding of an otherwise chaotic world."



Master Teachers Julie Andrew, left, and Kim Bunning use bricks to demonstrate the components of CU Teach during a recent presentation.

Importance of math and science teachers to our future

Several years ago, the National Academies created the Committee on Prospering in the Global Economy of the 21st Century. The top strategy outlined in the committee's report, *Rising Above the Gathering Storm*, was to recruit 10,000 science and mathematics teachers annually. In order to keep from falling behind in science, medicine and technology, the country needs more top-quality math and science teachers to educate future generations of students.

CU Teach, based on the UTeach program at the University of Texas at Austin, recruits top-notch math and science students at CU into K-12 teaching. The program reaches out to undergraduate students who excel in math and science and demonstrates that teaching is an exciting, enriching career possibility, as

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should learn
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Message from the Dean



“As the School of Education for Colorado’s flagship university, it has long been our purpose to recruit the state’s very best students into teaching careers.”

CU supporter Lindley Stiles created our “Best Should Teach” initiative because he abhorred the often repeated H. L. Mencken quotation, “Those who can—do. Those who can’t—teach.” As the School of Education for Colorado’s flagship university, it has long been our purpose to recruit the state’s very best students into teaching careers. In 1986, for example, when the state legislature wanted to save money by eliminating duplicative colleges of education, one legislator famously said that future teachers did not need to go to a research university. Led by then Associate Dean Phil DiStefano, CU won the day—thus preserving CU’s School of Education—by arguing to the contrary that teachers need deep knowledge of subject matter, and future teachers should indeed be the very best students in their respective fields.

Begun in 2003 by Astrophysics Professor Dick McGray and Education Professor Valerie Otero, CU’s Colorado Learning Assistant program has been highly effective in recruiting CU’s very best mathematics, science and engineering students into teaching. To be selected to be a learning assistant (LA), students must have previously earned an A in that course and LAs come to appreciate teaching’s intellectual challenge.

Teaching involves learning more about content (even if you thought you knew it pretty well) and about research on learning and teaching, especially if you aim for higher levels of critical thinking, not just memorization of facts. The Colorado Learning Assistant Model is so effective in increasing the learning of undergraduates AND recruiting K-12 teacher candidates that it is now being replicated in 30 universities nationally with support from the American Physical Society.

The recruiting power of the learning assistant program was further enhanced when we launched CU Teach in 2007 with funding from ExxonMobil’s National Mathematics and Science Initiative. As described in the cover story, significant features of CU Teach are one-credit classes that give students early experience teaching hands-on science lessons, rigorous, content-specific teaching methods courses, and expert and inspiring Master Teachers. The result of these efforts has been a dramatic increase in the number of undergraduate math and science teacher licensure candidates who are “the best” as evidenced by grade point averages *in their major* higher than the average GPA for that major (3.22 versus 3.10, across nine departments).

CU-Boulder has won several national recognitions for its STEM Education initiatives because Education’s strong collaborations with math and science departments are so unusual and because we have been judicious in collecting systematic evidence to evaluate program effects. For example, of our 95 math and science teachers who graduated in the last 3 years, we are in touch with all but 14. Seventy-five are teaching (61 in Colorado schools), the majority are in high-needs schools, and in follow-up observational studies former LAs are significantly better at implementing research-based teaching practices. In addition to replication of the LA program across the nation, social science departments at CU-Boulder want to adopt the learning assistant model to increase the interactive nature of large-enrollment undergrad classes, and we in the School of Education have created a Step Into Humanities Teaching class to recruit humanities students into teaching.

We are proud that we are able to recruit the very best teacher candidates and ensure they have the very best preparation. For today’s schools, nothing less will do. ■

*Lorrie Shepard, Dean and Distinguished Professor
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well as a rigorous, intellectual endeavor. CU students collaborate with Master Teachers in the School of Education and Mentor Teachers from local schools to develop and teach science and math lessons for elementary and middle school students.

The first courses students take are Step 1 (EDUC 2020) and Step 2 (EDUC 2030)—both of which are one-credit-hour courses. In Step 1, students explore teaching science experiments and in Step 2, students learn about inquiry-based lesson design and teach math and science to local public school students.

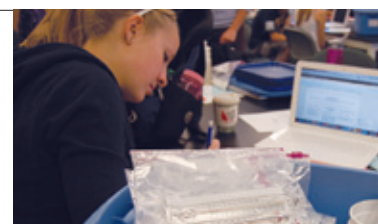
These Step classes give CU students the opportunity to try out teaching to determine if it is a career they want to pursue. Those students who choose teaching as a profession complete a content-rich major in math or science while simultaneously earning a teaching certificate through CU Teach’s four-year program.

Strengthening the way math and science are taught

Many schools today must use teachers who do not have the content knowledge in math or science provided by the CU Teach program and are thus teaching “out of field,” particularly in urban school districts. CU Teach enrollees are taught content-specific education courses, such as physics, mathematics and biology, and also learn teaching techniques that aid student learning. Of the 95 CU Teach graduates in the last three years, 61 of them went on to teach in Colorado schools.

“CU Teach makes a difference in the way our teachers are educated and in the way we partner with the community for teacher professional education,” says Associate Professor Valerie Otero, co-director with Professor Mike Klymkowsky, of CU Teach. “It is an interactive model for both teacher preparation and professional development.”

A CU student prepares a FOSS Kit to be used for teaching a science lab.



Another feature of the CU Teach program is its cross-campus collaboration with the College of Arts and Sciences and the College of Engineering and Applied Science.

“There is a real synergy with professors in these other schools who have shown a great interest in discipline-based educational research. They also care about teaching and learning and there’s a great connection between them and CU Teach,” said Andrew. In addition to Otero and Klymkowsky, she particularly noted the contributions of Noah Finkelstein (physics), Robert Parsons (chemistry), Eric Stade (mathematics) and Evelyn Puaa (mathematics).

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CU Teach: Help us meet a \$1 million challenge

by Margot Neufeld
Senior Director of
Development

There is no doubt that Colorado and the nation urgently need more and better trained science and mathematics teachers. CU has been working to solve this need as early as 2003 in collaboration with campus leadership and faculty in the College of Arts and Sciences as well as the College of Engineering and Applied Science.

Early success in STEM (science, technology, engineering and math) Education paid off when CU was recognized for its work and received a \$1.4 million grant from the National Math and Science Initiative (NMSI) in 2006 to replicate UTeach, a thriving program at the University of Texas at Austin aimed at recruiting the best math and science students into teaching.

At CU-Boulder, to date, the results of our collective efforts are impressive—the School of Education has more than doubled (from 31 to 65) the number of undergraduate math and science candidates enrolled in our secondary licensure program. CU Teach, along with the Colorado Learning Assistant Program, are credited with causing this dramatic increase.

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More than doubling the number of students going into math and science teaching is laudable, but equally impressive is the quality of these students—their average GPAs in their major (chemistry, physics, etc.) are higher than those of other students in the same major. So not only are we recruiting *more* students into teaching, we are recruiting some of CU's most talented students into teaching.

One unique feature of this grant is the opportunity to capitalize on the NMSI fundraising challenge—if the School of Education raises \$1 million in endowment to support CU Teach, NMSI will give us an additional \$1 million, effectively establishing a \$2 million endowment so CU Teach could be a permanent feature on the CU-Boulder campus.

Recent fundraising momentum, and a February gift of \$200,000 from The Anschutz Foundation, have pushed us nearly to the half-way mark toward our \$1 million goal. Every gift, large or small, counts toward the match and we need your help!

If you would like to help us reach \$1 million by July 31, 2012, please call Margot Neufeld, Sr. Director of Development in the School of Education at 303.492.2990 or margot.neufeld@cufund.org. ■



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HEADLINES

CU-Boulder nets \$1.5 million NSF grant to continue video game design research

Foundation. CU-Boulder researchers are tracking how video game design engages students in computational thinking and STEM-simulation design.

STEM simulations are computer programs that model natural and social phenomena, such as how a forest fire spreads from tree to tree. Students design these simulations to learn science, technology, engineering and mathematics, or STEM.

The new NSF-funded Computational Thinking for Teaching Computing grant to computer science Professor Alexander Repenning and co-investigators Kris Gutiérrez and David Webb from the School of Education, will build on previous work the team did on video game design as a motivational tool for computer science education.

That project, called iDREAMS, involved more than 100 teachers and over 8,000 students producing more than 10,000 games and STEM simulations.

The project started in Colorado but quickly expanded to Alaska, Ohio, Oregon, South Dakota, Tennessee, Texas and Wyoming where it gave teachers the tools and support needed to take the video game design curriculum into their classrooms. Participation far exceeded initial projections for the iDREAMS research project of about 40 teachers and 1,200 students over three years.

The curriculum, as taught through the Scalable Game Design Summer Institute on the CU-Boulder campus during the past three summers (and will be June 4-10 this summer), was found to be highly effective across a wide spectrum of communities, including technology hubs, urban/inner city, rural and remote Native American communities.

"We now want to analyze the impact of the research on students' motivation and what they are learning, continuing the success of the iDREAMS project," said Webb. "With the new grant, we can build up more robust research instruments that can be used for computer science education. We will continue to be very intentional regarding our research of particular populations and will be broadening the scope of groups studied." ■

The University of Colorado Boulder exceeded its own researchers' expectations with its iDREAMS Scalable Game Design Summer Institute, and that success has been rewarded with a new \$1.5 million grant from the National Science



A Scalable Game Design Summer Institute participant works on his design.

The University of Colorado Boulder is one of 34 new members nationwide selected to join an innovative organization committed to recruit, prepare and retain 100,000 science, technology, engineering and mathematics (STEM) teachers. CU was added to the partner membership of 100Kin10 following a rigorous vetting process.

"The '100Kin10' title of this effort refers to the National Academy of Sciences' recommendation to Congress that the U.S. give top priority to recruiting 100,000 math and science teachers over a 10-year period," said School of Education Dean Lorrie Shepard. "We at CU-Boulder are proud that we have already been working on this challenge for a decade and appreciate that our model programs are being emulated and replicated by others."

CU-Boulder is a national leader in STEM education, widely recognized for its CU Teach and its Colorado Learning Assistant programs, as well as its national influence on policy. The university has transformed the way STEM classes are taught on campus and has significantly increased the number of math and science majors entering the teaching profession. In 2010, CU-Boulder Chancellor Philip DiStefano joined the pledge to President Obama to double the number of science and math teachers graduated by 2015 as part of the "Science and Mathematics Teacher Imperative."

The 100Kin10 movement was launched in June 2011 at the Clinton Global Initiative with an initial pledge by partners to raise \$20 million to support the creative and strategic efforts of partner organizations to expand the nation's STEM teaching force. ■

STEM education efforts recognized by selection as 100Kin10 new member

CU-Boulder team selected for Mathematics Teacher Education-Partnership

A team that includes University of Colorado Boulder professors, as well as area school district administrators and math teachers, was selected to be a partner in the Mathematics Teacher Education-Partnership from among 40 applications nationwide. The team, known as the Colorado Partnership for Secondary Mathematics Education, will identify needs within secondary math education and strive to increase the number of well-qualified secondary math teachers entering the field.

The MTE-Partnership is a collaboration rooted in the Science and Mathematics Teacher Imperative of the Association of Public and Land-grant Universities. The CU-Boulder team includes Assistant Professor David Webb, Associate Dean for Teacher Education Jennie Whitcomb, and Master Teacher Kimberly Bunning from the School of Education; and Professor Eric Stadel and Associate Professor Robert Tubbs from the Mathematics Department. The other team partners who round out the Colorado Partnership for Secondary Mathematics Education are Connie Syferd, St. Vrain Valley School District's Assistant Superintendent of Student Achievement and Jackie Weber, Boulder Valley School District's Director of Mathematics. ■

Contingent Pedagogies

by William R. Penuel and
Angela Haydel DeBarger

Project improves student learning in science

William R. Penuel is professor in educational psychology and the learning sciences at the CU-Boulder School of Education. His research



focuses on teacher learning and organizational processes that shape the implementation of educational policies, school curricula and afterschool programs. In his research, he examines learning and development from sociocultural, social capital and complex systems perspectives. He is widely published in professional journals and serves as Associate Editor of the *Social and Institutional Analysis* section at the American Educational Research Journal, and he is on the editorial board for *Teachers College Record*, *American Journal of Evaluation* and *Cognition and Instruction*.



Angela Haydel DeBarger is Senior Research Scientist at the Center for Technology in Learning at SRI

International. Her research focuses on the design and validation of innovative assessments and in studying student motivation in learning activities.

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The *Framework for K-12 Science Education* (National Research Council, 2011) presents a new vision for how children should learn science. A committee appointed by the National Research Council and composed of researchers and leading science educators developed the *Framework*. It is guiding the development of the Next Generation Science Standards which, like the Common Core State Standards Initiative in mathematics and English/language arts, are expected to provide common, clear and high expectations for all students' learning.

The *Framework* introduces the idea of developing understanding of the core ideas of science through engaging students in the *practices* of science. The practices in the *Framework* clarify what is meant by "inquiry," a term that has come to have various meanings to science educators in the past two decades. The practices reflect the diversity of what scientists do, from posing questions to developing and using models to engaging in argument using evidence. Of course, the practices include planning and carrying out investigations, which many science educators already have their students do as part of inquiry science teaching.

Science is a set of practices for establishing, extending and refining knowledge. Students need to understand both the core ideas of science and how scientists come to develop those ideas. They need to appreciate that scientific knowledge is based on evidence from many investigations and grounded in theories and models of the world. Providing opportunities to engage in scientific practices can help students appreciate that science is a social, collaborative endeavor and that students can gain direct experience with the normative practices of scientific argumentation and supporting claims with evidence.

In the *Contingent Pedagogies* project, a team of researchers and teachers worked together to design tools to enhance opportunities for students in their classrooms to engage in the practices of explanation and in using models. We (Angela DeBarger of SRI International and Professor William R. Penuel of the CU-Boulder School of Education) lead the project, which is funded by the National Science Foundation. We worked collaboratively with sixth grade teachers in the Denver Public Schools to develop tools that were closely aligned to the inquiry-based Earth science curriculum adopted by the district. Our aim was to improve learning of the core ideas from two units by engaging students in the practices of explanation and model-based reasoning.

Starting with core ideas

Researchers have criticized science curriculum in the United

"Talk Moves" in science promoted in *Contingent Pedagogies*

Talk Move	Example
Revoicing	"So let me see if I've got your thinking right. You're saying _____?" (with space for student to follow up)
Asking students to restate someone else's reasoning	"Can you repeat what he just said in your own words?"
Asking students to apply their own reasoning to someone else's reasoning	"Do you agree or disagree and why?"
Prompting students for further participation	"Would someone like to add on?"
Asking students to explicate their reasoning	"Why do you think that?" "What evidence helped you arrive at that answer?" "Say more about that."
Using wait time	"Take your time... We'll wait."

Adapted from: National Research Council (2007)

States for being "a mile wide and an inch deep," in contrast to curriculum in countries that outperform us on international science tests. To address this concern, the *Contingent Pedagogies* team decided to focus on a few core ideas of Earth science related to plate tectonics and weathering and erosion.

Contingent Pedagogies provided teachers with tools that could be helpful in eliciting and interpreting students' conceptions of these ideas, both before and after instruction. Students often bring problematic ideas to the classroom, and it is important to surface and address these ideas in instruction to promote learning (National Research Council, 1999). To help teachers with this task, the *Contingent Pedagogies* provided sets of questions to elicit student thinking using a classroom set of clickers (a student response system) that would allow all students to respond simultaneously to the questions. The team developed the questions using research we had conducted on problematic ideas students typically hold with respect to the core ideas in the curriculum. Researchers organized these ideas, these *facets* of student thinking, into clusters to facilitate teachers' interpretation of student responses, using an approach developed by one of the project's collaborators, Jim Minstrell of Facet Innovations.

Developing student understanding through practices

When teachers trained in *Contingent Pedagogies* techniques use a clicker to pose a question to elicit student thinking, they can display a histogram of the responses for all students to see. Instead of just telling students the correct answer, the teacher asks students to consider why someone might think each answer may be reasonable and engages students in a discussion about the evidence that might support each of the answer choices. The teacher then has students use their clickers to answer the question again. Often—especially for questions teachers ask at the end of a

EYE ON RESEARCH CONTINUED FROM PAGE 5

student investigation—the students converge on the scientific understanding of the core idea.

The classroom discussions give students the opportunity to engage in the scientific practices of argumentation and developing explanations. Two tools we designed help teachers to engage students productively in these discussions. The first is *classroom norms*, which makes explicit the norms scientists use when deliberating about ideas. One of these is “support claims with evidence,” and teachers and students alike can invoke this norm as part of any class discussion. The second is a set of *talk moves*, which teachers can use to elicit and probe student thinking and encourage students to weigh different perspectives in discussion. Some of these moves are simple, such as “Say more about that,” or “Why do you think that?”, but they communicate powerfully that students are expected to support their ideas with evidence and link that evidence to the core ideas they are studying. Other research has shown that when teachers use these *talk moves* to promote student argumentation, students learn more effectively (Resnick, Michaels, & O’Connor, 2010).

These discussions wouldn’t be as productive, though, if students weren’t engaged in another practice as part of their science curriculum: planning and conducting investigation. The sixth grade science curriculum, *Investigating Earth Systems*, was developed by the American Geological Institute and TERC with funding from many sources, including the NSF. The curriculum is organized around a set of student investigations that are aimed at helping students construct models of phenomena they are studying. For example, in an investigation of plate tectonics, students use materials to simulate and observe what happens when two lithospheric plates collide. These investigations give students direct experience with conducting investigations and making models.

Teachers on the project team noted that even after completing investigations, students still have difficulty making connections between these models and geologic phenomena. To address this concern, the project developed a set of *Contingent Activities* that engage students in interpreting and making predictions about the models they are studying. Teachers use these when—even after discussion—many students are still having trouble understanding the core ideas or hold problematic conceptions about them.

For example, many students think that earthquakes happen during certain kinds of weather.

If many students in a class have this idea, the teacher can enact a *Contingent Activity* in which students interpret tables and graphs of earthquakes around the world and then have to construct an explanation for the patterns they see in the data. Weather data are included, but so, too, is information such as proximity to a plate boundary, so that students can construct a more scientific understanding of where earthquakes are likely to occur from the data.

Professional development component

The project team developed many tools for teachers to use, and learning to use them well is no easy matter. Teachers need to be able to listen for different facets of student thinking in discussion and bring out the right *talk move* at the right time to elicit student ideas effectively. They need to know, too, about the ways models can help students develop understanding of core ideas and integrate technology into their routine practice.

Therefore, the *Contingent Pedagogies* team provided extensive professional development to teachers to help them learn to use the tools. Teachers who had helped researchers design the tools co-led a two-day summer workshop that provided the basics of how to use the technology and how to use *talk moves* and *norms* to promote productive discussions. Over the course of a series of teleconferences every other week, the team provided teachers with more tips on how to interpret facets of student thinking and make use of the *Contingent Activities*. E-mail tips timed to arrive when teachers were engaged in particular investigations with students also provided additional support for teachers.

Research on *Contingent Pedagogies*

An important question that researchers are investigating in *Contingent Pedagogies* is whether teachers’ use of the tools can improve student learning. To answer that question, researchers conducted a field test with 19 teachers. Twelve were part of a group that received both professional development and the tools; seven teachers served as a comparison group. Students in the classrooms of all 19 teachers took two sets of pre- and post-assessments that focused on their understanding of the core ideas targeted by the project.

On both assessments, students in the *Contingent Pedagogies* classrooms scored higher than students in the comparison classrooms. The results, moreover, were statistically significant, even after accounting for differences in students’ pretest scores across the two groups. The class averages of nearly all of the

teachers who implemented the tools were higher than class averages of comparison teachers, as well.

At present, the researchers on the project are taking a closer look at teacher surveys and videotapes of classroom lessons. So far, there is evidence that the teachers made extensive use of all of the *Contingent Pedagogies* tools. They particularly liked the questions provided. As one teacher put it, “The questions themselves were really designed well—really good choices designed to get to their misconceptions, to help me get a good grasp as to what they are not understanding well.” Another teacher commented, “What I like about the questions, [is the] elicitations. ... I have a high number of ELLs, so to have entry points to gather background knowledge in a nonthreatening way, where they don’t need to have a right answer, is really useful.”

Next steps for the project

At present, the researchers on the project are developing a website where they will share the materials developed as part of *Contingent Pedagogies* and post research papers related to the project. The website will launch in summer 2012, but it will include some content beginning this spring. Be sure to check out <http://bit.ly/GE2AiB> for new content.

The team is also looking to extend its work to other curriculum materials and to different student populations. I (Penuel) have joined up with Professor Tamara Sumner of the Institute for Cognitive Science at CU-Boulder on a proposal to integrate the tools into a high school biology curriculum developed by the Biological Sciences Curriculum Service (BSCS). The team has also submitted a proposal to NSF to develop additional resources to help English Language Learners participate more in productive classroom discussions with *Contingent Pedagogies* tools.

As the new *Framework for K-12 Science Education* becomes more familiar to educators through revised standards for learning, more tools like those produced by the *Contingent Pedagogies* team will be needed. Tools are needed to help teachers make sense of the standards and then implement teaching strategies to help students meet the new standards. Research evidence from the *Contingent Pedagogies* project suggests that the tools that help teachers engage students in science practices of explanation and modeling can be powerful strategies to address this challenge. ■

Step Into Humanities Teaching

Course helps humanities students explore what it's like to be a teacher



Elizabeth Dutro is teaching the inaugural semester of Step Into Humanities Teaching

"Students spend time in local public school elementary classrooms, observing exceptional teachers and interacting with kids. Then, our students collaborate in teams to plan and teach two lessons focused on supporting the public school students' engagement and comprehension of read-aloud texts that supplement the classroom curriculum."

Undergraduate students majoring in humanities and social sciences now have a new opportunity to explore what it is like to be a teacher. The School of Education enrolled 16 students in its first Step into Humanities Teaching (EDUC 2050) course this semester.

"The Step Into Humanities Teaching class counts toward the school's Education Minor and can also serve as a gateway course for our Teacher Education program for both elementary and secondary English or social studies," explained Associate Professor Elizabeth Dutro, who is teaching the new class. "Students spend time in local public school elementary classrooms, observing exceptional teachers and interacting with kids. Then, our students collaborate in teams to plan and teach two lessons focused on supporting the public school students' engagement and comprehension of read-aloud texts that supplement the classroom curriculum."

The class is akin to the Step 1 and 2 courses in the CU Teach program, but only one Step course in humanities is offered. The class provides an opportunity for undergraduates to get an introduction to teaching with a humanities focus. Like the CU Teach Step courses, the humanities class is also a one-credit course.

Learning goals include:

- Begin to build complex understandings of learning and what it means to teach
- Conceptualize the kinds of dispositions, commitments and relationships necessary to support equitable educational opportunity for students
- Start to develop a keen observational eye in order to learn from time spent with elementary school students and experienced teachers
- Learn and implement one model of lesson design for supporting students' engagement with and deep understanding of text
- Engage in self-critique and respond to feedback in order to reflect on and hone teaching practice

In pursuit of these goals, students work within a reflection group throughout the semester. Group members provide a forum for debriefing practicum experiences, share in-class writing/reflections and give feedback on lesson ideas and practice.

An integral part of the course is the time spent in the host teachers' classrooms. "The teachers were chosen carefully and have enthusiastically agreed to welcome CU's students into their classrooms," said Dutro. "These host teachers provide positive models for our students. We are fortunate to have fantastic classroom teachers involved and a committed, enthusiastic group of undergraduates from across campus in our first iteration of this course." ■

Education Minor enrollments meet expectations

The School of Education's new Education Minor is enjoying a steady enrollment, with 19 accepted enrollees as of spring semester and more students in the queue awaiting approval for 2013.

"Our Education Minor offers a set of courses that challenges and engages. The enrollments in these courses are what we expected and with the addition of a few more new courses, we hope to round off our Education Minor listing," said Professor Dan Liston, co-director of the Education Minor with Professor Rubén Donato. "The number of students enrolled in the minor is growing and with

our continued efforts we hope to see a steady and satisfying increase."

The Education Minor, launched fall semester, offers the opportunity for students to investigate careers in education that go beyond the classroom teaching setting. The minor consists of two tracks: teaching and learning, and foundations and policy. After completing the requirements for the minor, students might take their training and apply it to jobs in the Peace Corps or youth centers, for instance.

For additional information, contact Dan.Liston@colorado.edu or Ruben.Donato@colorado.edu. ■

Total Enrollment for All Students
Taking Education Minor Courses

COURSE TYPE	SEMESTER	
	FALL '11	SPR '12
STEP	59	72
ED MINOR TRACK	40	67
Grand Total	99	139



Cory Pavichich

DISCOVERY & INNOVATION

Google @ CU Google Apps for Education pilot moves forward

by Cory Pavichich
Academic Technology
Consultant

"While D2L provides a powerful set of classroom tools, many university instructors desire more extensive collaboration features, including real-time collaboration spaces, website/wiki tools and integrated video conferencing. In the fall, the pilot group evaluated GoingOn, another education collaboration suite."

As part of a review of collaborative learning technologies, the Office of Information Technology (OIT) is partnering with a small group of faculty to pilot and evaluate the Google Apps for Education collaboration suite. This semester, two School of Education faculty, Elizabeth Dutro and Ben Kirshner, are participating in this pilot, allowing their students to collaborate within Google software using @colorado.edu e-mail addresses.

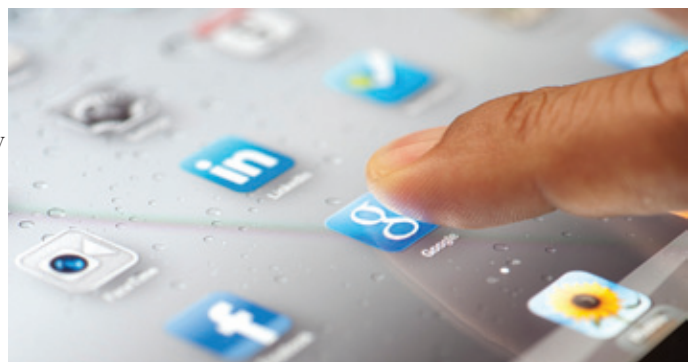
Many CU-Boulder users are already familiar with Google's commercial products, including Gmail, Google Docs, Sites, Calendar, Google+ and YouTube (among many others). Some faculty and students already use personal Gmail addresses to collaborate with others both at CU and around the world. But many users are unaware Google offers Google Apps, a more secure and contained collaboration environment for businesses, universities and school districts.

Google Apps allows access to most Google software using one's university identity to keep personal and professional Google Accounts separate. Using Google Apps helps IT support the use of Google software on campus. Google Apps is provided free to schools and universities.

In the past five years, educators have witnessed an enormous trend toward providing Google services for faculty, students and classroom teachers. In 2011, *U.S. News & World Report* published that 61 of the top 100 colleges and universities provide Google Apps services to students, and an informal survey found that most Denver area schools use Google Apps, including Boulder Valley School District, St. Vrain School District and Jefferson County Schools.

The Google Apps for Education pilot is part of a larger effort to choose a collaborative software package to enhance the new online learning environment Desire2Learn. While D2L provides a powerful set of classroom tools, many university instructors desire more extensive collaboration features, including real-time collaboration spaces, website/wiki tools and integrated video conferencing. In the fall, the pilot group evaluated GoingOn, another education collaboration suite. Additionally, the OIT/faculty pilot group is looking at Microsoft 365 for Education, Microsoft's soon-to-be released competitor to Google Apps. This pilot is only looking at the collaborative software suite (primarily Google Docs, Sites, Calendar and Google+). OIT is not considering the use of Gmail at this time.

OIT appreciates having School of Education faculty contributing to the larger conversation around what technologies are best for our campus. The input received from Dutro and Kirshner, along with their students, will inform whether CU-Boulder "goes Google" or whether OIT should seek other technologies to meet teaching and learning needs. To provide input on this process based on personal use of Google technologies or any other collaborative learning platform, please contact Mark Werner, Associate Director of Academic Technology Research, who is the lead on the pilot: mark.werner@colorado.edu. ■



CU TEACH CONTINUED FROM PAGE 2

CU Teach students gain valuable experience

Stephanie Horn completed her CU Teach requirements and is now student teaching in Silver Creek High School in Longmont, Colo., continuing to tackle what it's like to teach mathematics.

"I learn a lot from teachers—and even if I'm not always in agreement with what the teacher is doing, the teacher always takes time to explain to me why it's being done this way. It makes me reflect on what teachers do and how to make it better," she said. She learned about the CU Teach

program during orientation her freshman year and enrolled in it her second semester. She is grateful for the "taste of teaching" she got in the Step courses.

Caleb Ulliman jokes that he was prompted to take the Step 1 CU Teach class because the course is for merely one credit. "Just one credit—that's how they hook you," he laughed. Once he began taking his first class, though, his own experience as a CU student changed. "Right away I felt that I got the personal instruction I wasn't getting in my larger science classes," he said.

For biochemistry major Ulliman, whose father is

an engineer, the idea of teaching never occurred to him. "Engineer, scientist, businessperson—I always thought these were what I'd do." That's before School of Education Colorado Learning Assistant Project Coordinator Laurie Langdon asked him these fateful words: "Have you ever thought about being a teacher?"

While at Manhattan Middle School of the Arts and Academics as part of his Step 2 course, Ulliman took note of the teacher's methods. "He was the conductor of his classroom and I started to appreciate at a different level the complexity that is really teaching," Ulliman said. ■

Alumni Profiles

views education

Dorothy Aguilera-Black Bear

“Giving back is a huge theme in my career and my life,” said alumna Dorothy Aguilera-Black Bear. A Choctaw on her father’s side, Aguilera-Black Bear has spent the past two decades supporting decolonization of education in schools serving tribal communities.

She explained that being native shapes one’s destiny. “Social justice and self-determination are pretty aligned in my work because the community guides that,” she said. “Aspirations grow very long-term in our communities, starting as children. Giving back is a huge value in native indigenous epistemologies. We are mentored to grow into adults who can give back to our communities.”

There is no doubt that she succeeded—if not exceeded—that goal. Aguilera-Black Bear earned her bachelor’s, master’s and doctorate degrees at CU-Boulder. She considers herself blessed to have had various mentors who helped her create her career path. Among them were (the late) Salvador del Pino, Elisa Facio and Margaret (Marki) LeCompte. Experiences with them included international travel, teaching and research guidance.

It is Professor LeCompte from the School of Education who received credit, though, for broadening Aguilera-Black Bear’s perception of herself as a researcher and professor. She contends that she might not have made it through her graduate degrees were it not for LeCompte’s encouragement.

“She truly mentors her students,” said Aguilera-Black Bear of the now emerita faculty professor. “Dr. LeCompte sees the potential in all her students even if we don’t see it ourselves. I did not see myself as a professor in higher education but saw myself primarily working with community and I wasn’t sure how to balance that out. She encouraged me at all those crossroads.”

A true balance, Aguilera-Black Bear said, would not have been possible without native leaders in the Denver and Portland communities who also encouraged her to follow the path of educational leadership, fostering culturally responsive education in schools serving native populations. She also credits native scholars and activists who shaped leadership for sovereignty and self-determination for indigenous peoples for their influence on her research. These

life mentors are too numerous to name individually in this story.

As a result of her community of support, Aguilera-Black Bear’s career trajectory has met her purpose in multiple ways, encompassing more than 20 years of research and evaluation experience with diverse and mainstream communities and schools both domestic and international, as well as exploration into the fields of native wellness and leadership. Currently, she is the Director of Institutional Research for Northwest Indian College, Bellingham, Wash. There, she holds an administrative position that involves analyzing data that focuses on what helps students be more successful. The school, the only accredited tribal college in the states of Washington, Oregon and Idaho, is a four-year degree institution with campus sites at six tribal communities. It serves native students who are affiliated with more than 140 different tribal nations.

For several decades previously, Aguilera-Black Bear concentrated her research and evaluations on improving schools serving native populations in urban and rural setting across the Southwest, Midwest, Central and Pacific Northwest regions through teacher education and educational leadership programs. She also built partnerships that led to initiatives for effective school reform.

“I consider my professional career and much of my personal aspirations as a storyboard shaped by community. When you start out on a path, it’s a journey that becomes a storyboard that helps one reflect on those experiences and how each of these prepare you for the next leg of the journey. The storyboard is a metaphor for life,” said Aguilera-Black Bear. “Where I am now is in this stream of community-based leadership in a higher education institution which comprehensively influences nation-building across tribal communities with present and future generations. This is an intentional path for self-determination and sovereignty where tribal nation communities control their educational systems to fully serve the people.” ■



Dorothy
Aguilera-Black Bear

Marki LeCompte praises her former student

When Marki LeCompte had the honor of hooding Dorothy Aguilera-Black Bear for her PhD, she said the following during the 2003 graduation ceremony:

“Dr. Dorothy Aguilera, the only member of her family to earn post-high school degrees, initially was told to become a beautician by high school counselors. While working as an electrician, a maintenance engineer in the Cherry Creek School District, and as manager of a convenience store, she raised a son, Terry, and a daughter, Gayla. Enrolling in CU’s Department of Communications, she graduated with high honors in 1992, and then earned an MA in CU’s School of Education. As a doctoral student, she was awarded a Title VII Bilingual Fellowship by the School of Education. Her PhD thesis, “Who Defines Success? An Analysis

of Competing Models of Education for American Indian and Alaskan Native Students,” is a 14-site, qualitative and quantitative analysis of success and failure in schools serving American Indian students. It is based on five years of research as a consultant and evaluator for schools implementing indigenously generated and federally mandated school reform models.”

Since having the privilege throughout the years since that time to continue to collaborate and extend their friendship, LeCompte added this update:

“I have been so proud of her. Dorothy was the only student I’ve ever had who not only could write an article with me, but help me rewire a light socket or unstop a drain. Few people know she was a licensed electrician, a super chef and a great partner on road trips! Prior to coming to CU, she did

all manner of jobs—managing convenience stores, working in restaurants and as a school custodian. She got familiar with elite public schools from the underside: She was a maintenance person in the Cherry Creek School District. While Dorothy’s professional accomplishments have been incredible, and her published output rivals that of any of her peers in established institutions, the fact that she did all of this while raising three generations of children—her own, her grandchildren for a number of years, and her current adopted family of two little boys—is all the more astonishing. A consummate teacher, mentor, researcher, colleague and dear friend, Dorothy is the only former student whom I could unequivocally recommend for any position to which she applied. And her courage in facing down adversity of all kinds is awe-inspiring.” ■

Alumni Profiles

Andi O'Connor

If you ask Andi O'Connor (PhD '98, MA '90, BFA '79) whether or not she finds her doctorate worth the effort, the short answer is: absolutely!

"People frequently ask me, 'Is it worth it to get your PhD?' and I always say my doctorate from CU opens more doors than I could ever imagine," O'Connor said.

Although she earned three degrees at CU-Boulder, O'Connor has found that her doctorate in Educational Foundations, Policy and Practice particularly prepared her to tackle life as a tenure-track academic, as well as multiple professional opportunities.

"The level of challenge we had in this program and the successes I see in my CU colleagues in both traditional academic and non-traditional careers are because we all had that level of preparation," O'Connor explained. She credits the program with teaching her how to write, think and conduct research more effectively, as well as how to develop curriculum, speak publicly and teach—all attributes that have supported her career.

A professional public speaking coach, speech writer, curriculum developer and trainer, O'Connor founded Communication Consulting, Inc. in 2005. Prior to opening her consulting firm, she was an assistant professor at Ohio University and a visiting professor at the University of Colorado Boulder.

In a terribly unfortunate turn of events, O'Connor even found her CU education of value when her house in Sugarloaf burned to the ground on Labor Day 2010. Known as the Four Mile Fire, it was the most destructive fire in the state's history, burning thousands of acres and destroying about 169 homes in the normally picturesque mountains west of Boulder.

As a result of the fire, O'Connor started a blog, "Burning Down the House: Essays on the Poetry of Loss." The blog has won national acclaim and resulted in her being featured in *The New York Times*, on National Public Radio, MSN and in the local press. Her blog has resonated so well with readers that she hears from people worldwide who claim she helped them "put words to my experience when I couldn't."



Andi O'Connor stands at the site of her former Sugarloaf home just days after fire destroyed it.

O'Connor credits her writing experiences at CU under the tutelage of Distinguished Professor Margaret Eisenhart for honing her ability to "tell a good narrative story and for teaching me how to edit. She taught me to write down what I see and then take out all the bad sentences." (Eisenhart commented, "It was a real pleasure to work with Andi and so many other doctoral students who have passed through our program since I have been at CU. Andi is a wonderful example of someone who has made her training and degree work for her.")

O'Connor is rebuilding her home in the mountains, and compares the decision making required for that project to the "daunting experience" of writing her 400-page dissertation.

"I remember how I had to organize all those chapters and I liken that to the decisions I make for the new house. I have kept very organized files and definitely put my research skills to use," she said.

"My doctoral experience has served me in so many ways—in the world of tenure-track academe, in my consulting practice and in my personal life. I made life-long friends and had the benefit of world-class professors who continue to encourage and mentor me. I'm constantly grateful for the quality of education I received at CU." ■

FACULTY

Rubén Donato was inducted into the 2012 Class of Fellows of the American Educational Research Association during AERA's Annual Meeting

Margaret Eisenhart presented the Keynote Address, "Landscapes of Difference and Inequality through the Lens of Educational Ethnography in the U.S.," at the Conference on Ethnography and Difference in Educational Fields: International Developments, in Erlangen-Nuremberg, Germany

Gene V Glass, **Alex Molnar** and **Kevin Welner** were quoted in numerous publications on the topic of online education, based on the results of a study reported in an NEPC brief co-authored by Welner and Glass

Kris Gutiérrez was selected by the International Reading Association to be part of an expert research panel intended to provide leadership for quality literacy instruction; she was also nominated by her peers into the Reading Hall of Fame and will be a plenary speaker at the Physics Education Research Conference in Philadelphia this summer

Ben Kirshner and PhD alumna **Kristen M. Pozzoboni** co-authored "Student Interpretations of a School Closure: Implications for Student Voice in Equity-Based School Reform" in *Teachers College Record*, Volume 113, Number 8

Margaret LeCompte and **Dorothy Aguilera-Black Bear** have co-authored "Revisiting Reliability and Validity in Higher Education Research and Program Evaluation" (2012) in *Secolsky*,

education *views*

KUDOS Current news of faculty, students and alumni

C. & Denison, D. B. (Eds.), *Handbook of measurement, assessment and evaluation in higher education*, New York, NY: Routledge; additionally, LeCompte was presented with the George and Louise Spindler Award for Distinguished Scholarly Contributions to the Field of Educational Anthropology at the annual meeting of the American Anthropological Association in Montreal, Quebec, Canada

Michele Moses and doctoral candidate **Christina Hong Paguyo** co-authored "Debating affirmative action: Politics, media, and equal opportunity in a 'Postracial' America" for the *Peabody Journal of Education*, 86(5), 553-579

Lorrie Shepard talked about the purpose and practice of teacher evaluation at the 18th Annual Boisi Lecture in Education and Public Policy and was featured in *Boston College Magazine* and *The Boston College Chronicle*

David C. Webb had his proposal, "Teacher Change in Classroom Assessment: The Role of Teacher Content Knowledge in the Design and Use of Productive Classroom Assessment," accepted for the 12th International Congress on Mathematical Education to be held in Seoul, Korea, July 8-15, and was invited to serve as a team member for Topic Study Group 33, "Assessment and testing in mathematics education"

Kevin Welner was inducted into the 2012 Class of Fellows of the American Educational Research Association during AERA's Annual Meeting

Shelby Wolf's latest monograph, *Hand in Hand: The Art of Amalgamation*, was published by Future Creative

STUDENTS

Stephanie Barr, **Mike Ross**, and Associate Professor **Valerie Otero** were finalists for the 2011 Physics Education Research Conference Proceedings Paper Award for their paper, "Using Artifact Methodology to Compare Learning Assistants' and Colleagues' Classroom Practices"

Karla Del Rosal Bujanda presented at the 56th Annual Comparative and International Education Society Conference in Puerto Rico on "Appropriating Formative Assessment as a Tool for Assessing and

Promoting Mathematical Academic Language Among English Language Learners"

English education preservice teachers **Kaitlyn Dillon**, **Jessica Romero** and **Katie Volkmar** presented at the annual National Council of Teachers of English convention in Chicago. Their presentation, "Paying Attention to Language in Secondary ELA Classrooms: Power, Style, and Variety," was based on course projects from their "Language Study for Educators" class with Professor **Anne DiPardo** last fall

Amy Farley, doctoral candidate in Educational Foundations, Policy and Practice, was selected for a 2-year, full-time fellowship with the Strategic Data Project at the Center for Education Policy Research at Harvard University

Alaina Feltenberger, a doctoral student in Literacy Curriculum and Instruction, was published in *Praxis: A Writing Center Journal* and the National Writing Project republished an earlier article of hers

Kara Gray gave an invited talk at the winter national meeting of the American Association of Physics Teachers entitled "Evaluating the Colorado LA Program as a Teacher Preparation Program" and she participated in a "Methods for Evaluating Teachers" session

Jaclyn Hernandez received word that the *Bilingual Research Journal* wants to publish her review of UBRJ-2011-1191 - Fredric Field. (2011). *Bilingualism in the USA: The case of the Chicano-Latino community*. Amsterdam & Philadelphia: John Benjamins Publishing Company

Cristin Jensen Lasser presented at the 56th Annual Comparative and International Education Society Conference in Puerto Rico on "Collaborative Strategic Reading for Emerging Bilinguals"

David Meens, doctoral candidate in Educational Foundations, Policy and Practice, had his paper, "The Politics and Philosophy of 'Serving America': An Exploration of the Conceptual Basis of Federal Service-Learning and Civic Engagement Initiatives," chosen for presentation at the Philosophy of Education Society annual meeting in Pittsburgh, Penn., and for publication in *Philosophy of Education Society Yearbook*

Ben Van Dusen and Associate Professor **Valerie Otero** were finalists for the 2011 Physics Education Research Conference Proceedings Paper Award for their paper, "Changing Roles and Identities in a Teacher-Driven Professional Development Community"

ALUMNI

Robbie Bean (PhD '79) of Denver, who retired in 1992 after 35 years of teaching in the Denver Public Schools, received numerous awards this year: the 2012 Martin Luther King, Jr. Business Social Responsibility Award and its sixth annual Trailblazer Award, a Community Award from New Hope Baptist Church and the Humanitarian Lifetime Achievement Award for 2011 from the Dr. Martin Luther King Jr. Colorado Holiday Commission

Research and Evaluation Methodology PhD alum **Matt Gaertner** won the Association for Institutional Research 2012 Charles F. Elton Best Paper Award

Chase Grubman returned to the U.S. in December 2011 after teaching English to Chilean students through the English Opens Doors Program in Chile—his blogs about his experiences were published on the School of Education's website

Heidi Iverson wrote the winning paper for the 2011 Physics Education Research Conference Proceedings Paper Award for "Understanding the Variable Effect of Course Innovations on Student Learning"

Ben Johnson, **Ina Rodriguez-Myer** and **Jan Smith** were finalists for Impact Awards from Impact on Education

Janet Lopez, who earned her MA in Educational Foundations, Policy and Practice, has been named program officer for the education program area at Rose Community Foundation where she will direct efforts to promote effective teaching and systemic changes in education

Diane Ullman (PhD '86) was selected by the Connecticut Association of Public School Superintendents as the Superintendent of the Year for 2012; she is currently the Superintendent of the Simsbury Public Schools ■



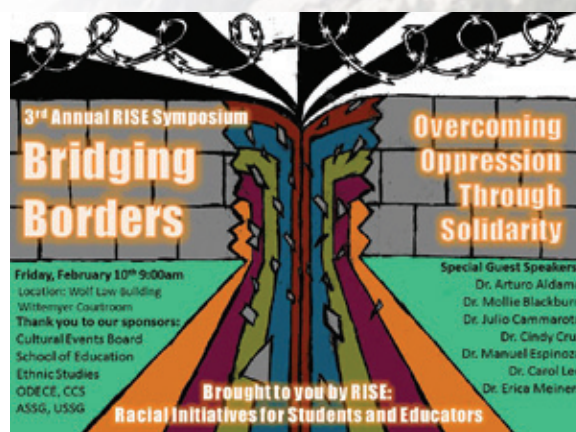
R.I.S.E. Symposium opens broad dialogue on oppression

The 3rd Annual R.I.S.E. Symposium, “Bridging Borders: Overcoming Oppression through Solidarity,” brought together panelists, students and faculty for robust discussions on oppression, education policy, barriers and bridges.

Panelists for the Feb. 10 event were: Arturo Aldama, University of Colorado Boulder; Mollie Blackburn, The Ohio State University; Julio Cammarota, The University of Arizona; Cindy Cruz, University of California, Santa Cruz; Manuel Espinoza, University of Colorado Denver; and Erica Meiners, Northeastern Illinois University. Elizabeth Dutro from the CU-Boulder School of Education served as the faculty advisor.

R.I.S.E. (Racial Initiatives for Students and Educators) received support and sponsorship from many organizations and businesses. Sponsors included CU’s Cultural Events Board; School of Education; Department of Ethnic Studies; Office of Diversity, Equity and Community Engagement; Council on Colleges and Schools; Arts and Sciences Student Government and USSG. About 100 people attended the day-long event that was held in the Wittmeyer Courtroom in the Wolf Law building.

Symposium volunteers included: Subini Annamma, Tori Barber, Stephanie Barr, Carrie Bemis, Andrea Bien, Meg Burns, Mike Dominguez, Jackie Hernandez, Heather Hudson, Darrell Jackson, Liz Mendoza, Irwin Manangkil, Christina Paguyo, Ryan Pflieger, Chelsey Shade, Mike Wenk and Katy White. Special thanks were accorded to the Student Organization Financial Office and Norm Skarstad. ■



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