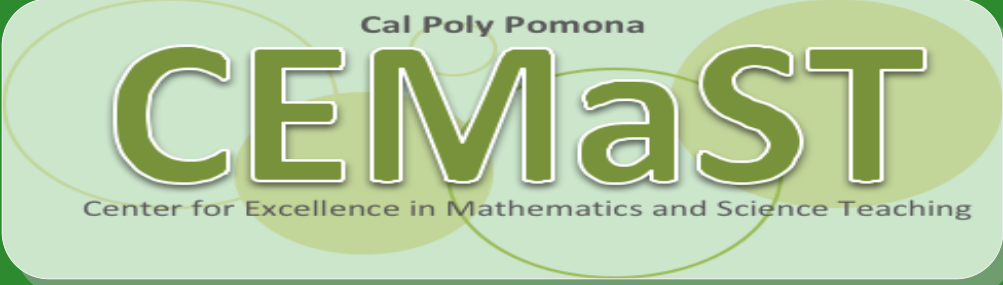


# CEMaST NEWS



## OF INTEREST TO STUDENTS/ TEACHERS:

- Funds available to support future teachers
- Information on how to become a single subject teacher
- Understanding the periodic table
- Upcoming conferences and events

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SPRING 2014

# Cal Poly Gets Record Grant!

A new grant worth nearly \$8 million—the largest Cal Poly Pomona has ever received—will soon begin providing funding for a groundbreaking science education partnership with the Pomona Unified School District.

The National Science Foundation has awarded \$7.7 million to Cal Poly Pomona’s Center for Excellence in Mathematics and Science Teaching (CEMaST), whose mission is to improve teaching and learning of science and mathematics from kindergarten to graduate school. CEMaST is the vehicle through which the College of Science collabora-

tively serves the educational community with the College of Education and Integrative Studies.

Cal Poly Pomona will use the grant to establish a new program called Reinvigorating Elementary Science through a Partnership with California Teachers (RESPECT). The program is a partnership among Pomona Unified School District, Cal Poly Pomona, and the Biological Sciences Curriculum Study (BSCS), a non-profit science education center in Colorado.

CEMaST Research Director Nicole Wickler, Biologist Paul

Beardsley, and Mathematician Arlo Caine, will oversee the program which will directly benefit nearly one third of Pomona Unified’s elementary teachers and 7,500 of its students. RESPECT’s premise is simple: Cal Poly Pomona professors (nine from the College of Science and one from CEIS) will work together with science educators at BSCS to support Pomona Unified teachers in implementing science curriculum and pedagogies that will engage students in learning science content within the framework of the Next Generation Science

*Continued on page 2*



The RESPECT Leadership Team left to right: Paul Beardsley, Stephanie Baker (PUSD), Kathy Roth (BSCS), Nicole Wickler and Arlo Caine.

# Interested in a Career in Teaching?



To become a math or science teacher in California you must obtain a Single Subject Teaching Credential. This credential authorizes public school teaching in a departmentalized classroom such as those in most middle schools or high schools. To obtain a Preliminary Credential the following requirements must be met:

- Bachelor's Degree or higher from a regionally accredited university.
- Completion of a teacher preparation program (credential program, including student teaching)
- Meet the Basic Skills Requirement (CBEST exam)
- Demonstrate subject matter competency with the passage of California Subject Examinations for Teachers (CSET) or completion of approved single subject program.

Cal Poly has an approved single subject program for mathematics and science as well as a credential program. For more information or for an advising appointment please contact CEMaST at [cmast@csupomona.edu](mailto:cmast@csupomona.edu).

*Wickler says there's plenty of opportunity in science for math and language arts.*

## Cal Poly Gets Record Grant!

*Continued from page 1*

Standards. Those teachers will develop skills as teacher leaders and go on to share with other teachers what they've learned, greatly expanding the reach of the program. The activities of teachers and faculty will lead to large scale, sustainable reform in the delivery and learning of science and mathematics at both Pomona Unified and Cal Poly Pomona.

In recent years, the pressure put on K-12 educators to increase English and math scores on standardized tests has resulted in science education often taking a back seat.

But Wickler says there's plenty of opportunity in science for math and language arts. The students will be learning math as they work with data and language arts as they reflect on their learning and write and speak about their findings.

"That's what real scientists rely on," she says. "You can't do science without developing skills in reading, writing and math."

The first cohort of teachers is joining the RESPeCT program in the summer of 2014.



# Scholarship Funds Available



Dr. Nicole Wickler has announced that scholarship funds are available for the 2014-15 academic year through the Math and Science Teacher Initiative (MSTI) Scholarship Program. The program's objective is to support talented Science and Mathematics majors who might not have considered the teaching profession. Each MSTI Scholar can receive up to two years of scholarships, up to \$5,000 per year. MSTI Scholars are selected on the basis of academic achievement, under-representation and financial need. MSTI Scholarships are available to those seeking a single subject credential in Biology, Chemistry, Geology, Mathematics, and Physics. Scholarships will be awarded on a competitive basis and there are minimum requirements for

undergraduate students.

They include:

- a declared Cal Poly major in a Mathematics or Science discipline.
- at most two years and 96 units remaining to complete bachelor's degree.
- an overall GPA of 3.0 with a preference given to those who have a GPA no lower than 3.0 in their major.
- Be a US citizen, national, or permanent resident alien.

There are also scholarships available for single subject mathematics or science credential candidates. The deadline for the fall quarter is August 11, 2014. For more information and to apply please visit the website

<http://www.csupomona.edu/~msti/msti-scholarship/index.shtml>

*MSTI seeks to encourage talented Science and Mathematics majors who are considering secondary teaching.*

## CSET Preparation Science/Math

MSTI offers FREE CSET Preparation Workshops for science and math majors who are interested in obtaining their Foundational Level General Science Credential or their Foundational Level Mathematics Credential.

The Science CSET Preparation for the CSET Science Subtest I

and II (Tests 118 and 119) consists of online prep courses and is provided at no charge to Cal Poly students, and credentialed teachers who are already working in a classroom.

The CSET Preparation for CSET Mathematics Subtest I and II (Tests 110 & 111) are in the form of summer workshops

and are offered free of charge to Cal Poly students and credentialed teachers who are already working in a classroom. The workshops provide an intensive review of mathematics concepts and skills required for the CSET tests.

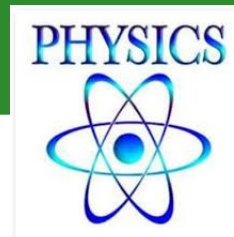
For more information please visit the CEMaST website.

## Monthly Seminars Offered

CEMaST offers a seminar series for students to learn about teaching as a career and to promote innovative and effective teaching strategies. The seminar series begins with a fall reception and continues to meet once a month during the academic year. Past seminars include teaching demonstrations from local teachers, K-12 classroom video analysis of teaching and learning, review of educational research papers, resume development, and interview techniques.



**The Noyce Seminars will continue next year supported by MSTI**



## Cal Poly's Learning Assistant Program

With initial funding from Cal Poly's PhysTEC grant Dr. Homeyra Sadaghiani, started the Learning Assistant (LA) program in the Department of Physics and Astronomy. The objective of the program is to recruit and prepare undergraduate students with a strong physics background into a pathway to teach physics. The LAs work with faculty members to make physics courses more collaborative, student-centered and interactive. The Learning Assistant program also provides potential future teachers with strongly supported and low-stress early teaching experiences that can en-

courage them to pursue teaching certification. The program recruits successful undergraduate physics majors and minors who have completed the introductory courses with A's or B's and are interested in teaching. They also need to be able to interact well with other students. Once selected the students have support and training with key elements that include:

- Content:** Weekly instructional planning with reformed course instructors
- Pedagogy:** LA Seminar
- Practice:** Early teaching experience

Dr. Sadaghiani reports that the program has impacted the culture of the department in a positive way as faculty are making key contributions in the education of future physics teachers. She also has preliminary data showing the physics knowledge of the LA's is enhanced as well as the undergraduate students in classes using LAs. From the table below we see that students in classes with LAs score significantly higher than their peers on the E&M diagnostic test.

*"I have had a great experience being a Learning Assistant..."*

	Classes With LAs	Classes Without LAs	Senior Physics	LAs
Ave. Score	45%	35%	45%	90%

LAs at work



The success of the program has spread to other departments. This last Fall, Dr. Paul Beardsley implemented the LA model in CPP Biology courses with support from CEMaST, the California MSTI grant, and the Department of Biological Sciences. Dr. Sadaghiani acknowledges support from Cal Poly Pomona PhysTEC grant, the Department of Physics and Astronomy, the College of science, the NSF Robert Noyce Scholarship Grant and the California State University MSTI Grant for making this program possible.

*For more information on the LA program please contact the CEMaST office.*

# Periodicity Unlocked: Organizing Elements on the Periodic Table



By Dr. Jodye Selco

Understanding how the periodic table is organized and how to read the information embedded within this graphic organizer has been a mystery to many people for too long. Now, an electronic game is available at <http://www.csupomona.edu/~jiselco/periodictable/> to help visualize both the organization of the elements on the periodic table as well as trends in atomic size. In this simulation, the player of the game is asked to sort atoms of each type of element onto the periodic table - portions, or blocks, at a time.

Beginning with the “main group” elements, you drag

and drop individual atoms into the appropriate portion of the periodic table. To complete the game, you need to sort the atoms by both size and number of valence electrons (outer most electrons on the atom). When the atom is placed into the correct elemental box, the chemical symbol appears in the box in the upper left corner. Upon completion, you can see that the number of valence electrons increases from left to right, and the radius of the atoms decreases from left to right. The decrease in size is due to the increasing positive nuclear charge in the nucleus of the atom, which increases the electrostatic force between the positive nucleus and the negative electrons.

The game also includes the transition-metal elements and the lanthanides and actinides. These atoms too are sorted by the number of valence electrons and the radius of the atom. When complete, a repeating pattern of valence electrons across the entire periodic table becomes visible along with a noticeable trend in the sizes of the atoms. Additionally, the completed periodic table with both atoms and numbers of valence electrons is made available as a certificate of completion.

“to complete  
the game you  
need to sort  
the atoms...”

H	1																	He	2																						
Li	3	Be	4																	B	5	C	6	N	7	O	8	F	9	Ne	10										
Na	11	Mg	12																	Al	13	Si	14	P	15	S	16	Cl	17	Ar	18										
K	19	Ca	20	Sc	21	Ti	22	V	23	Cr	24	Mn	25	Fe	26	Co	27	Ni	28	Cu	29	Zn	30	Ga	31	Ge	32	As	33	Se	34	Br	35	Kr	36						
Rb	37	Sr	38	Y	39	Zr	40	Nb	41	Mo	42	Tc	43	Ru	44	Rh	45	Pd	46	Ag	47	Cd	48	In	49	Sn	50	Sb	51	Te	52	I	53	Xe	54						
Cs	55	Ba	56	La	71	Hf	72	Ta	73	W	74	Re	75	Os	76	Ir	77	Pt	78	Au	79	Hg	80	Tl	81	Pb	82	Bi	83	Po	84	At	85	Rn	86						
Fr	87	Ra	88	Lr	103	Rf	104	Db	105	Sg	106	Bh	107	Hs	108	Mt	109	Ds	110	Rg	111	Cn	112	Uut	113	Fl	114	Uup	115	Lv	116	Uus	117	Uuo	118						
				La	57	Ce	58	Pr	59	Nd	60	Pm	61	Sm	62	Eu	63	Gd	64	Tb	65	Dy	66	Ho	67	Er	68	Tm	69	Yb	70										
				Ac	89	Th	90	Pa	91	U	92	Np	93	Pu	94	Am	95	Cm	96	Bk	97	Cf	98	Es	99	Fm	100	Md	101	No	102										

**Congratulations Jodye Selco!**  
**Here is how you did.**

*Main Group Elements: 54 moves*  
*Transition Metals: 57 moves*  
*F-block: 29 moves*

The original idea for this new way to visualize the organization of the periodic table was developed by Dr. Jodye Selco along with two Rialto Unified School District teachers, Ms. Mary Bruno and Ms. Sue Chan for a professional development workshop in Rialto USD funded by the California Mathematics and Science Partnership grant program. Mr. Erick Zelaya and Ms. Bo Yeun S. Choi in Cal Poly Pomona's eLearning helped develop the on-line game.



*MTF Teacher Johnny Reyes speaking at the CMC conference in Palm Springs*

# Master Teacher Fellows!

Cal Poly is in the third year of a five year research grant aimed at the development of Master Teachers. The professional development program is for 7th and 8th grade science and/or math teachers and is funded by the National Science Foundation. We are pleased to feature two of our Master Teachers both from the 7th grade group. Johnny Reyes is a math teacher in Pomona Unified School District, and Julie Allender teaches science in Ontario Montclair. Both are outstanding teachers who are making great contributions to teaching and preparing the next generation of teachers.

## Johnny Reyes

Being part of the CEMaST MTF program at Cal Poly Pomona these past two years has reinforced my desire to be the best all around math teacher. This program allowed me to develop best practices for the classroom, take on leadership roles and to be visible in the learning community. The two-week workshops were filled with ideas for teaching math. The lessons we developed made us confi-

dent in taking on the Common Core Math standards head on. I have been challenged not only in the classroom, but to be confident to share and guide educators around me. I had a student teacher for the first time and the new coaching skills I acquired were put to use in nurturing a young educator. The leadership roles this school year came by way of Middle School Lead Teacher and advisor to our Leos club.

The challenges did not stop there. I was given the opportunity to partner with a fellow Teacher

and present a lesson at the CMC conference in Palm Springs this past November. This was definitely the highlight of my school year. Speaking and sharing a lesson with other math teachers in Southern California has taken me to the next level and to hopefully share a lesson in Washington DC this summer. I have always wanted to go beyond the classroom to learn more strategies to help my students. Feeling better about making a difference in our learning community is only one of the many priceless benefits of the CEMaST MTF program.

## Julie Allender

I love teaching...students are the biggest benefit, but pre-service teachers and my team are a close second. I believe I am good teacher, but I also know there are many ways in which I can grow. Participating in the NOYCE grant has been an amazing journey and I am ecstatic that this journey has just begun.

I never thought I'd be comfortable doing presenting at a National Conference. For example, I have presented in Washington DC, with my cohort and professor, to a group of scholars about a different approach to teach genetics. Though this was nerve wracking presentation, we did a great job and had meaningful conversations with a diverse group of people. Presenting in DC propelled my desire to present at a National Science Teachers Association conference at the end of the year.

One of my favorite parts of NOYCE is working with the student scholars. They are full of energy, ideas, and will-

ing to learn. I am impressed with their level of expertise and willingness to teach a lesson well before they are required to within a teaching credential program. I enjoyed mentoring them well beyond contractual hours.

Our wacky, fun, but deeply committed team has worked to create meaningful science lessons that embed the CCSS in LA and Math. We stretch ourselves to learn new content, and learn how to apply it within a middle school science classroom. This experience could not have been as pleasurable without this group of professionals or the student teachers. I am forever grateful for all they have taught me.



# **CEMaST**

## **College of Science**

### **Cal Poly Pomona**

Mailing address:  
CEMaST  
Cal Poly Pomona Building 4-2-515  
3801 West Temple Ave  
Pomona, CA 91768

Office: 909-869-4725  
Fax: 909-869-4616  
E-Mail [cemast@csupomona.edu](mailto:cemast@csupomona.edu)

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HUB THROUGH WHICH THE COLLEGE OF SCIENCE PROMOTES EXCELLENT AND EFFECTIVE STEM TEACHING AND LEARNING AT ALL LEVELS. OUR MISSION IS TO PROMOTE, PRACTICE, AND STUDY RESEARCH-BASED PRACTICES IN SCIENCE AND MATHEMATICS EDUCATION TO ENHANCE TEACHING AND LEARNING IN OUR COMMUNITY.



## Upcoming Events of Interest to Teachers

The **San Gabriel Valley California Mathematics Project (SGVMP)** has spring and summer opportunities coming up. Dr. Greisy Winicki-Landman is the director for the project that provides professional development programs for teachers in the San Gabriel Valley area/region. The San Gabriel Valley California Mathematics Project, located in the Department of Mathematics and Statistics at California State University, Pomona, offers research-based programs aligned with the Common Core, English Language Development, and Career & Technical Education standards that are designed to improve student understanding of

mathematics. The Director, Dr. Winicki-Landman, says the program is open to all interested teachers and there are no restrictions on registration. For more information you can visit the website at



Teachers at SGVMP workshop

[http://csmv.ucop.edu/home/site\\_detail/119/cmp](http://csmv.ucop.edu/home/site_detail/119/cmp)

May 31, 2014 - May 31, 2014  
**Making Sense with Number Sense**

June 23, 2014 - June 26, 2014  
**Support Students Making Sense of Mathematics- Fostering Understanding and Reasoning in Your Class**

June 30, 2014 - July 3, 2014  
**Support Students Making Sense of Mathematics- Fostering Understanding and Reasoning in Your Class**

*The CEMaST Newsletter Committee welcomes news from faculty, students and teachers. Please contact Dr. Laurie Riggs, [lriggs@csupomona.edu](mailto:lriggs@csupomona.edu) for information on how to be included in upcoming issues!*