We are grateful to every district, school, foundation, and individual who supports the CRR programs.

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Baxter Charitable Fund

District Partnerships 2017-2018
- Altar Valley School District
- Amphitheater School District
- Benson Unified School District
- Catalina Foothills School District
- Continental School District
- Flowing Wells School District
- Marana Unified School District
- Sahuarita Unified School District
- Santa Cruz Valley School District
- Sierra Vista School District
- Sunnyside Unified School District
- Tanque Verde School District
- Tucson Unified School District
- Vail Unified School District

School Partners 2017-2018
- Academy of Tucson *
- AmeniSchools
- City High School
- Highland Free School *
- Imago Dei Middle School *
- Paulo Freire Freedom Schools
- Pima Community College West
- Presidio Schools *
- San Miguel High School
- The Gregory School
- Tucson Country Day School *

* denotes new partners in 2017-2018

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Mathematics Educator Appreciation Day Conference Partners
- Tucson Unified School District
- Pima County School Superintendent’s Office
- Texas Instruments
- Mind Research
- Houghton Mifflin Harcourt
The Center’s Vision
An excellent mathematics teacher for every child in every grade

The Center’s Mission
Attract and prepare mathematically talented college students to become mathematics teachers
Retain and support mathematics teachers currently in the classroom

Highlights of the 2017-2018 School Year

The Center’s 14th Annual MEAD Conference hosted a record 110 sessions. The keynote speaker, Dr. Sandra Crespo, inspired the participants to honor and leverage the language and cultural diversity of their students in order to improve learning for all students. See page 5.

The Center offered five Herbst Enrichment Mathematics Seminars, with an average of 22 teachers attending each session. See page 10.

A second year of the IMPACTS K-5 program kicked off with a weeklong Mathematics Summer Institute for 16 teams of elementary teachers thanks to the financial support of the Thomas R. Brown Family Foundation. See page 3.

The Advanced Placement Exam Day hosted an all time high of 296 students and 23 teachers. See page 9.

The Center began piloting the IMPACTS-MS program to support the unique needs of middle grades teachers and students. The pilot program was made possible by the Center’s partnership with the Thomas R. Brown Family Foundation and began with a weeklong Mathematics Summer Institute. The rest of the IMPACTS-MS program pilot will take place during the 2018-19 school year. See page 4.

The Center received an AmeriCorps grant for Student Thinking Enrichment through Mathematics Mentors (STEMM), a tutoring and mentoring program, which served 20 teachers in their first two years of teaching, 36 UA undergraduate students, 16 experienced classroom teachers, and more than 1000 K-12 students. See page 8.

The Center hosted its first ever Summer Learning Lab, supporting 24 rising 6th grade students’ transition to middle grades mathematics, while providing classroom teachers multi-tiered professional learning and coaching. See page 6.

The Center maintained 21 partnerships from 2016-2017 and added 4 new partnerships. See page 15 for a complete list of partners and donors.
Teachers throughout the United States, and especially in Arizona, have finally garnered the attention of the nation for school safety, professional status and preparation, school funding, and teacher pay. At the Center for Recruitment and Retention of Mathematics Teachers, we have the honor of working with many public, charter, and private school teachers. We are first-hand witnesses of the dedication, hard work, and professionalism of teachers. Though the political landscape continues to change, we are encouraged by the spotlight that has finally been shown on education, exposing the many needs of teachers and support professionals. We are proud of our public-private partnerships with the business community, helping provide teachers with important professional growth opportunities, without the burden of cost for the teachers. We are proud of the ever-expanding services we offer teachers as a result of the support we receive from partners and donors. We hope this national spotlight on teachers and the teaching profession brings great improvement in public school funding, school safety, and teacher salaries.

The CRR continues to advocate for Southern Arizona teachers at State Board of Education meetings, through the Governor's Office of Youth, Faith and Family, in regional meetings, and at national gatherings. We thank you for joining us as we stand with teachers!
Improving Mathematical Problem solving, Acumen, & Confidence for K-5 Teachers and Students Program (IMPACTS K-5)

 IMPACTS K-5 is a professional development and teacher leadership program has three main components. The CRR offers a series of teacher workshops throughout the school year to address essential mathematical concepts in grades K through 5. Elementary school teachers from all partners may attend any or all of these workshops. An intensive one-week Mathematics Summer Institute is provided to teams of teachers who wish to begin the journey of teacher leadership from the classroom. A two-day leadership retreat is provided to a select group of teachers from across Tucson and surrounding areas who endeavor to continue their teacher leadership journey by leading regionally. Sixteen teacher teams attended a one-week Mathematics Summer Institute in June to deeply explore elementary mathematics and to design site plans for professional development that will share strategies and content with colleagues in their schools. Parents and administrators were invited to attend two days of the Institute alongside their teacher teams. The IMPACTS program is made possible by the generosity of the Thomas R. Brown Family Foundation.

“The classes I have taken have enriched my instruction. My students are excited when I tell them I have a class at the UofA, because it means we will have a new way of looking at math.” - Karen Couch Murphy

“I am a regular attendee and this program has changed my life. It has given me access to a potential career option. I truly wanted to be a professional teacher educator.” - Elisabeth Bankhead

“The knowledge and experience that I have gained through theses classes has been shared with colleagues and used on a daily basis with my students. The fact that I don’t have to pay for this means that I don’t have to hesitate to attend.” - Jamie Drobeck

James Kautz Memorial Endowment

James Kautz retired from Goldman Sachs in 1987 and moved to Tucson in 2006. Jim became involved in the UA Center for Recruitment and Retention of Mathematics Teachers (CRR) almost immediately upon his arrival in Tucson. He has provided advice and much-needed funds to support the outreach efforts of the CRR. In 2012, Jim married Mary Nickerson and both Jim and Mary have been instrumental in supporting the Mathematics Educator Appreciation Day conference each year. They have been advisors to the CRR Directors and Co-Directors, regularly discussing the needs of the CRR and the services that the CRR can provide Tucson teachers and students. Jim and Mary continued to support the CRR’s efforts with generous gifts each year.

Jim, Mary, and the Kautz Family Foundation have left a large footprint on the Tucson community. Jim passed away last year, and to honor him and his legacy, the James Kautz Memorial Endowment has been established. The endowment will support the CRR programs that he cared so much about.
The Arizona College & Career Ready Standards provide the blueprint for what students should know and be able to do. Dedicated educators continually search for effective lessons and strategies to ensure that students are meeting and exceeding the standards. CRR provides workshops in the evenings and on Saturdays to help teachers engage in exemplary lessons and strategies both as mathematics learners and as educators. They then implement these in their own classrooms to develop deeper student understanding of concepts. The participants earn continuing education hours for their involvement in and implementation of ideas from these highly interactive workshops.

“I have always given my students the definition and in the data workshop, it was suggested that we try to get the students to discover the definition. We were just starting determining the area of composite shapes and I decided to try having the students give their own definition. I drew an example on the board and then let them each come up with their own definition. Some of them really struggled to put their idea into words and could only give an example taken from real life. I was pleased with this because it showed that what we were about to do in class had applications in life.” - Kitsie Wright (Reflection on Classroom Implementation)

“After the students worked through the problem, they brainstormed and made predictions about what these numbers could reveal about society at the time…It led to an interesting discussion… Ultimately, they had to apply rational economic thinking and use their cost/benefit and net benefit calculations to make a choice.” - Clare Curry (Reflection on Classroom Implementation)

Improving Mathematical Problem solving, Agency, & student-Centered instruction for 6-8 Teachers and Students Program (IMPACTS-MS)

Similar to the elementary program, IMPACTS-MS provides professional development and leadership opportunities for middle school mathematics teachers. The Summer Institute focused on the Critical Foundations of Algebraic Thinking in order to inform teachers’ classroom practices and to prepare them to implement professional development at their school sites. The Thomas R. Brown Family Foundation funded the piloting of the middle school Summer Institute, and will provide funds for the first year of the IMPACTS-MS program.

“This institute really changed my thinking and perception of how I can help my students with math. It showed me things I can immediately take back to the classroom and things to continue to work on. It gave me a new way to look at student work and how to arrange my lessons.” - Anonymous

“This is by far the best, most practical, and most applicable training I have attended as a math teacher. Our students will learn so much as a result of our training.” - Rob Hilliker

“Thank you for the opportunity to make a meaningful difference in students lives. I became a teacher to make a difference in the world. You have given me a valuable tool (this class) that will make a difference in the education of my students. Thank you again from the bottom of my heart!” - Matt Kornacki
MEAD was held on January 20, 2018. 138 different presenters facilitated 110 sessions at Tucson High Magnet School. 588 K-16 participants attended four different 50-minute sessions followed by a luncheon and keynote presentation at the University of Arizona Student Union Grand Ballroom. Several public officials attended and addressed the audience at the luncheon, including the Mayor of Tucson, State Senators and Representatives, and county and district superintendents.

The keynote speaker, Dr. Sandra Crespo, engaged the audience in a discussion about the rich mathematical resources that arise from student discussions. She utilized video from classrooms both in the United States and her native Dominican Republic to demonstrate the mathematical discourse possible when students work together to make sense of tasks.

The luncheon was dedicated to the memory of Jim Kautz, a community leader and dear friend of the CRR who passed away in 2018. Participants were invited to donate to the James Kautz Memorial Endowment.

"I truly enjoyed this conference. All of my sessions were good and I took something away from all. I am recommending this to my colleagues for next year!" - Administrator

"This is the best professional development opportunity for mathematics educators in the entire state. An invaluable experience and resource for teachers." - Secondary Teacher

"Providing a day like this where educators are celebrated and supported, especially in the form of professional development means that we get to leave a little more secure in ourselves and the reasons that we do, what we do. I left with resources I didn't have before, talked to and networked with teachers and administrators from other schools and districts, and was even able to contribute what I know to the conversation. The conference gave me a much needed boost of optimism and hope." - Elementary School Teacher

Herbst Enrichment Mathematics Seminar

With generous support from Lee and Arthur Herbst, the Center offered five Saturday workshops in which local master teachers shared their expertise in mathematics content and pedagogy with colleagues. Herbst Seminars focus on connecting content to practice and providing teachers with concrete tools and techniques to use in the classroom. Participants receive a continental breakfast, a stipend, and continuing education hours for their participation in and implementation of ideas from these highly interactive workshops.

Promoting Mathematical Understanding Through Visualization Tools- facilitated by Sharon Newman

Desmos-The New Standard for Graphing Calculators– facilitated by Greg Epstein

Building Your Problem Solving Muscles: It is not as easy as it sounds! (two-part workshop)- facilitated by Toni Martinez and Sara Thompson

Experience before Explanation: Engaging Students in Experiences to Build Ideas and Understandings- facilitated by Carrie Burdon

“I find that working with other teachers provides me with the confidence to bring new ideas to the students in my classroom. Hearing about students’ reactions and thinking before I implement allows me to support them better.” - Nancy Turner (High School Teacher)

“As a new teacher, this was so incredibly useful and informative for me. I feel much more confident about my ability to reach all of my students in valuable ways. I am inspired and empowered to try new things and experiment with new tools. I look forward to future HEMS workshops.” - Maria Grainger (Middle School Teacher)

“Attending these Saturday workshops energizes me and ignites some new excitement to try new things in my classroom to help me help my students!” - Connie Tresvik (High School Teacher)
Summer Learning Lab

For the first time, the CRR hosted local students for a summer mathematics experience. Twenty-four students preparing to enter 6th grade participated in the weeklong Learning Lab where they worked in small groups to explore concepts critical to middle grade mathematics, such as, ratios, proportions, and proportional reasoning. Lab stations were facilitated by 9 local teachers who were refining their instructional practices to best support group collaboration and students’ conceptual understanding. Teacher Leaders from the IMPACTS program served as whisper coaches to help teachers reflect on and improve their pedagogical moves.

“This is a great experience that I would highly recommend, as it gave me a hands-on experience in teaching math in a new way.”
- Learning Lab Teacher

“The Learning Lab was an incredible opportunity for myself as a teacher and coach, and for my students who participated. I have already recommended the program to teachers for next summer! Thank you so much for this FUN and valuable learning opportunity! I truly enjoyed every moment of it.”
- Learning Lab Coach

“[Student Name] had an eye-opening experience during the math lab. She learned that she over thinks a problem and makes it more difficult for herself. The lab gave her confidence. She extremely enjoyed herself. She had a blast!”
- Learning Lab Parent

Advanced Placement Practice Exams
(http://crr.math.arizona.edu/advanced-placement-mathematics-practice-exams)

Thanks to Bruce MacMillan’s leadership, CRR has been sponsoring Advanced Placement Calculus (AB and BC) Practice Exams since 2008.

Students have the opportunity to take a mock timed AP test prior to taking AP exams. The multiple-choice portions are scored while the students complete the free response items. Facilitators then teach the students how to score their own free response answers. In this way, students learn the expectation for a well-written, complete solution. By the end of the day, students know what score they would have earned for the exam. The experience gives them practice answering sample items and gives them insight into what preparation is necessary prior to taking the actual AP exam two weeks later.

Beginning in 2014, Josh Tabor started a parallel Advanced Placement Statistics Practice Exam. The statistics students experience a similar format, so that they too know what they would have scored on an actual exam.

While the students are taking their practice exams, local AP teachers meet to share ideas, lessons and strategies.

On May 5, 2018, 296 students and 23 teachers participated in the AP Practice Exams.
New Teacher Induction Program for Secondary Mathematics
(http://crr.math.arizona.edu/new-teacher-induction-program)

The New Teacher Induction Program supports middle and high school mathematics teachers in their first two years of teaching. Participants attend monthly Saturday sessions throughout the school year. These sessions provide a format to share ideas, materials, and concerns, while deepening mathematical knowledge, modeling good teaching, and promoting collegiality.

Each participant works with an Induction Coach. These coaches are former middle or high school master teachers. Coaches meet with teachers several times per semester to support teachers’ instructional shifts towards active learning and deep mathematical exploration, including professional growth in promoting discourse, maximizing classroom participation, instruction, collaboration, lesson planning, classroom management, student motivation, assessment techniques and more.

Furthermore, each participant selects three students from their classrooms to mentor throughout the school year. Mentoring students not only improves student attendance, achievement, and graduation rates, but it also improves teacher satisfaction, efficacy, and retention.

Twenty teachers participated in the New Teacher Induction Program during the 2017-18 school year.

“Overall, this program has been the most helpful, positive, and supportive part of my first year of teaching. Thank you for letting me be a part of it!! I loved the Saturday sessions - learning new math activities, sharing those activities with my students, learning better teaching methods (the demonstration of teaching methods during the sessions was really helpful), getting to talk to colleagues. I always left the sessions feeling energized (even when I came to them stressed out or tired).” - Middle School Teacher

Student Thinking Enrichment through Mathematics Mentoring (STEMM) - An AmeriCorps Program
(http://crr.math.arizona.edu/math-mentors-tutors)

STEMM recruits mathematically talented college students who are committed to serving their community, regardless of whether they are considering a career in education. These UA students enroll in a one-credit mathematics course that focuses on tutoring techniques, supporting conceptual mathematics understanding and multiple approaches to problem solving. The UA students also attend monthly Saturday trainings to help them use successful mentoring practices. The college students serve five to ten hours per week in selected elementary, middle and high school mathematics classrooms. The UA students work with their cooperating teachers to identify three students who can use additional targeted support. The UA students mentor the three youth throughout the school year in addition to the classroom service hours, making a personal connection and difference in their mentees’ lives. UA students also volunteer for Family Math Nights, STEM nights, and Math Carnivals at schools throughout the Tucson area. UA Students earn a living stipend for their dedicated, reliable community service, and they have the opportunity to receive an education award upon completion of the program. The teachers with whom they work are chosen based on their enthusiasm for mathematics and teaching, their student-centered classroom environments, and their knowledge of current state standards and effective learner-centered practices.

“Watching that shift in that child’s mindset from ‘I can’t do it’ to ‘I am capable’ has been amazing to experience!” - Kathleen Bernard (Tutor Mentor)

“UA tutors are a great asset to the classroom and I always enjoy having them! I appreciate all the help I get from the UA tutors. They help create an academic atmosphere in the classroom.” - Brenda Ugalde (High School Teacher)