# Regional Math and Science Center (GVSU) 2013-2014 Annual Report

The Regional Math and Science Center (RMSC) located at Grand Valley State University was established in 1994 to serve as a catalyst for change and improvement of mathematics and science learning. The Center serves approximately 10,000 teachers and 180,000 students in Kent, Ottawa, and Montcalm counties.

## Overview of the Year's Accomplishments

- Expanded the content and usage of our **Discovering STEM Kits**. These kits, which are loaned to schools for use in family STEM nights, afterschool programming, and classrooms, are designed to incorporate real-world concepts that pique student interests and critical thinking skills while also motivating performance in STEM subjects. In collaboration with GVSU faculty and students, the number of kits available tripled with the addition of mathematics kits. The kits were used by Priority Schools (Godwin Heights and Aberdeen Elementary) as well as the Grandville Cook Library Scholars afterschool program that services two schools in the Grand Rapids Public School District that have high Hispanic populations.

- Served as a regional hub for the third year of **Project PRIME** (PRIME Plus), a continuation of the Algebra for All initiative, providing professional learning for over 80 teachers from Ionia, Kent, Montcalm, Muskegon, Newaygo, and Ottawa Counties. This five-session, sustained professional learning program builds the understanding of algebra content and pedagogical knowledge of middle and high school teachers to ensure that mathematics classroom instruction meets the learning needs of all students. Particular attention was paid to the eight mathematics practices for instruction as delineated in the CCSS. The RMSC role as a hub included facilitated delivery of content; classroom and professional learning community coaching; distribution of materials and record-keeping related to evaluation; and general workshop facilities and materials arrangements.

- Conducted the **sHaPe** (Summer Health Activities and Professions Exploration) camp for 40 urban students in the greater Grand Rapids area (primarily Grand Rapids and Wyoming Public Schools, both which have Focus Schools in their districts). sHaPe, a four day summer camp, provides middle school students with the opportunity to explore careers in the health sciences, participate in hands-on science activities that include laboratories and simulations, gain academically challenging scientific knowledge, learn about personal health and fitness, understand and develop compassion for those with disabilities, and have a positive exposure to a college experience in a safe setting.

- Hosted the 30th Annual **Region 12 Science Olympiad Tournament** in which almost 1,300 students from 66 secondary schools in Kent and Ottawa Counties competed. The theme this year was "Bridge to the Future". Even though events that students compete in have changed over the years, our focus of Science Olympiad remains relevant to today's need for STEM capable students.

- Completed a successful **External Review** with the Michigan Department of Education following the previous year of needs assessment and strategic plan development. The reviewers summarized their analysis and comments with the following statement: *"The Regional Mathematics and Science Center continues to be a benefit to its districts in many capacities. The Center is a very important piece with respect to mathematics and science education services in its area and in the state."*

## Organization of the Report

The Strategic Plan identifies six service areas: Leadership, Professional Learning, Student Services, Curriculum Support, Community Involvement, and Resource Clearinghouse. This report will focus on Professional Learning and Student Services for the entire service area. In addition, there will be a narrative on closing the achievement gap describing services to Priority and Focus School(s) in the area, including successes and challenges.

## REGION-WIDE PROFESSIONAL LEARNING

***Goal: For educators who participate in Center Professional Learning to reflect best instructional practices in their own settings.***

### Who participated in the professional learning?

Professional learning opportunities were provided for classroom teachers, classroom support staff, administrators, parents/community members, and others involved in K-12 education. The table below describes who participated.

### Table 1: Participants Receiving Professional Learning

| | | | Reported Gender** | | Position | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Participants** | **# of Indiv.** | **Total Hours** | **M** | **F** | **Admin** | **Math Tchr** | **Sci Tchr** | **Tech Tchr** | **Comb Subj** | **Other or Unknown*** |
| **Pre-School** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Elementary** | 79 | 463.25 | 10 | 56 | 2 | 0 | 1 | 0 | 69 | 7 |
| **Middle/Jr. High** | 111 | 936.25 | 28 | 70 | 1 | 35 | 56 | 0 | 4 | 15 |
| **High School** | 171 | 2,742.5 | 64 | 88 | 0 | 65 | 78 | 0 | 1 | 27 |
| **K-12 Mixed Levels** | 54 | 439.25 | 15 | 31 | 5 | 7 | 15 | 0 | 4 | 23 |
| **Other*** | 193 | 1,872 | 39 | 81 | 2 | 8 | 9 | 0 | 1 | 173 |
| **Total** | 608 | 6,453.25 | 156 | 326 | 10 | 115 | 159 | 0 | 79 | 245 |

*Other includes persons who work across levels, are not teachers or administrators, or did not indicate position.
**Gender was not reported by all individuals.

Professional learning was delivered in many ways, depending upon the identified needs. Two primary formats included: (1) **Single events**, lasting for a portion of one day to several consecutive days, focused on a particular topic, skill, or issue; and (2) **Series,** which were a series of sessions (one building on the previous one and conducted periodically over a several week/month period). The goal was to systematically strengthen teaching practices based on local needs and current research.

**Teachers who participated in GVSU Regional M/S Center activities received, on average, 11 hours of professional learning related to mathematics, science, technology, engineering, or other.**

Table 2 below details the number of sessions offered for each subject by grade level as well as total hours and total number of participants in the sessions.

## Table 2: Professional Learning Activities

| | | Math | Science | Technology | Engineering | Other | Total |
|---|---|---|---|---|---|---|---|
| **Elementary** | Events | 2 | 0 | 0 | 0 | 0 | 2 |
| | Hours | 4 | 0 | 0 | 0 | 0 | 4 |
| | # Participants | 17 | 0 | 0 | 0 | 0 | 17 |
| **Elementary & Middle/Jr. High** | Events | 0 | 0 | 0 | 1 | 0 | 1 |
| | Hours | 0 | 0 | 0 | 1 | 0 | 1 |
| | # Participants | 0 | 0 | 0 | 14 | 0 | 14 |
| **Middle/Jr. High & High School** | Events | 17 | 5 | 0 | 0 | 0 | 22 |
| | Hours | 91.5 | 32.75 | 0 | 0 | 0 | 124.25 |
| | # Participants | 325 | 51 | 0 | 0 | 0 | 376 |
| **High School** | Events | 21 | 31 | 0 | 0 | 13 | 65 |
| | Hours | 112 | 214 | 0 | 0 | 71.5 | 397.5 |
| | # Participants | 45 | 191 | 0 | 0 | 55 | 291 |
| **K-12 Mixed Levels** | Events | 4 | 6 | 2 | 0 | 0 | 12 |
| | Hours | 25 | 16 | 8 | 0 | 0 | 49 |
| | # Participants | 211 | 306 | 12 | 0 | 0 | 529 |
| **Total** | Events | 44 | 42 | 2 | 1 | 13 | 102 |
| | Hours | 232.5 | 262.75 | 8 | 1 | 71.5 | 575.75 |
| | # Participants | 598 | 548 | 12 | 14 | 55 | 1,227 |

## *Spotlight on Professional Learning*

- **Project PRIME Plus (PRIME/AFA):** This was the third year for PRIME. The RMSC has served as a hub for this program (both PRIME and its predecessor, Algebra for All). Total attendance for this five-session series was over 80 teachers from Kent, Ottawa, Montcalm, Muskegon, and Newago Counties. At the beginning and the end of the program the teachers were required to take the Learning for Mathematics Teaching Scale (LMT) which measures content knowledge for teacher mathematics. For the results of this test, teachers from the GVSU RMSC showed an increase from 77.6 percent correct to 80.7 percent correct over the course of the year. This represents a statistically significant change ($p < 0.05$). Self-reported indicators of teacher pedagogical practices also indicated significant improvement. This year included a new component which allowed the opportunity for teachers to collaboratively plan a lesson and then observe one of the teachers on the team teach the lesson to students. This was followed by a critique and discussion of the lesson.

- **Fall Science Update:** This year's conference theme was *"Next Generation Science: Bridge to the Future".* The keynote speaker was Dr. Brian Reiser from Northwestern University. Dr. Reiser discussed the research-based recommendations for reform of K-12 science education that motivated the development of the NRC Science Education Framework and its implementation in the Next Generation Science Standards (NGSS). Additionally, there were over thirty breakout sessions providing content information and teaching strategies for K-12 teachers in biology, chemistry, earth science, environmental science, physical science, and physics. Sessions featured best practice teaching strategies as well as tools for the classroom. This year, 242 teachers attended the conference.

- **Participation in Statewide Programs:** Teachers from the RMSC service region participated in three statewide professional learning initiatives that included:
  - **SaM$^3$ (Science and Mathematics Misconceptions Management:** Secondary teachers from Wyoming High School participated in Cohort 3 activities that included a 5-day summer institute followed by afterschool professional learning community sessions throughout the 2013-2014 academic year.
  - **EMATHS *and* Modeling in Physics and Chemistry:** Several teachers from the RMSC service region benefited from participation in these two professional learning series supported by MSP grants held by other Math/Science Centers.

# Student Services

Student services are delivered based on identified needs to improve and enhance science, technology, engineering, and mathematics education. Students who participate in enrichment activities have the opportunity to explore new concepts, develop process skills, cooperate on group tasks, and discuss their findings. Student services include:

- ❖ afterschool and summer enrichment and support programs
- ❖ organization of science and mathematics academic competitions

Table 3 below details the number of student sessions offered for each subject by grade level as well as total hours and total number of participants in the sessions.

**Table 3: Student Services Activities Provided in 2013-2014**

| | | Math | Science | Technology | Other | Total |
|---|---|---|---|---|---|---|
| **Pre-School** | Events | 0 | 1 | 0 | 0 | 1 |
| | Hours | 0 | 2 | 0 | 0 | 2 |
| | # Participants | 0 | 12 | 0 | 0 | 12 |
| **Elementary** | Events | 10 | 9 | 0 | 0 | 19 |
| | Hours | 26.75 | 16.5 | 0 | 0 | 43.25 |
| | # Participants | 1,640 | 1,814 | 0 | 0 | 3,454 |
| **Elementary & Middle/Jr. High** | Events | 11 | 0 | 1 | 1 | 13 |
| | Hours | 16.5 | 0 | 5 | 30 | 51.5 |
| | # Participants | 385 | 0 | 100 | 38 | 523 |
| **Middle/Jr. High** | Events | 2 | 5 | 1 | 0 | 8 |
| | Hours | 8 | 39 | 3.5 | 0 | 50.5 |
| | # Participants | 133 | 296 | 28 | 0 | 457 |
| **Middle/Jr. High & High School** | Events | 1 | 2 | 0 | 0 | 3 |
| | Hours | 6.5 | 14 | 0 | 0 | 20.5 |
| | # Participants | 74 | 1,306 | 0 | 0 | 1,380 |
| **High School** | Events | 0 | 2 | 1 | 0 | 3 |
| | Hours | 0 | 8 | 2.5 | 0 | 10.5 |
| | # Participants | 0 | 206 | 12 | 0 | 218 |
| **Total** | Events | 24 | 19 | 3 | 1 | 47 |
| | Hours | 57.75 | 79.5 | 11 | 30 | 178.25 |
| | # Participants | 2,232 | 3,634 | 140 | 38 | 6,044 |

# *Spotlight on Innovative Student Services*

**Super STAT-urday:** In celebration of the International Year of Statistics, the RMSC, in conjunction with GVSU's Department of Statistics, held *Super STAT-urday* for 115 middle grades students. A major goal of Statistics 2013 was to promote public awareness of the power and impact of Statistics on all aspects of society. Specifically, the goal of *Super STAT-urday* was to invite students in West Michigan to attend and participate in a series of hands-on activities designed to better acquaint them with the role that statistics play in a wide variety of disciplines and in our daily lives. This event, held on Saturday, November 9, 2013, allowed students to learn about the use of statistics in sociology, geography, chemistry, biology, and water resources.

Overall, *Super STAT-urday* was very successful. The students were genuinely excited about the learning experiences that the event provided. A written-response question asked of students was "On Monday, at school, what is one thing you will tell your friends about *Super STAT-urday*?" and evoked the following responses:

- *I went to this really cool statistics thing on Saturday.*
- *I will tell my friends that Super STAT-urday is fun and educational!*
- *It's awesome and they should come with me next time.*
- *That is [sic] awesome and I can't wait to do it again!*

**Grandparents Camp:** The third annual G3 Summer camp was held on June 24-26th, 2014. This camp brings together two generations from the community who participate in this three day on-campus experience together. Grandparents of any age and their grandchildren between the ages of 8-12 were welcomed to the Niemeyer Living Center on the Allendale campus for three days of learning, living, and playing together.

The major goals of the camp are to strengthen the bonds between these two generations while introducing young students to the university experience. This year we had 71 participants representing 30 families. Campers attended sessions based in mathematics, statistics, archeology, physics, biology, biomedical science, chemistry, criminal justice, hospitality, music, engineering, and history.
One grandparent (representative of the many that affirmed the camp experience for themselves and their grandchildren) told us:

> *Camp was wonderful! My grandsons and I truly had a memorable time. They haven't stopped talking about it. One is a child who likes to explore and gets bored with hearing about "stuff" he already knows something about. He was not bored for one minute. Both boys loved being on campus and meeting real professors.*

**sHaPe (Summer Health and Professions Exploration) and the Discovering STEM Kits:** These are two additional innovative student programs that are referenced earlier in this report.

# *Closing the Achievement Gap*

The GVSU Regional Math and Science Center encompasses a three-county region which includes the largest urban school district on the western side of the state. As Grand Rapids Public Schools (GRPS) contains several high-priority, underachieving schools at all grade levels, the RMSC has worked to engage teachers and students of all grade levels within this district in programs designed to improve teacher efficacy and student engagement in STEM. The RMSC also services rural districts with high free and reduced lunch rates as well as migrant populations and reaches out to those districts as well.

**Closing the Achievement Gap—Students:**

- **sHaPe:** At the middle grades level, students attending Grand Rapids and Wyoming Public Schools were the focus of programming and recruitment for our Summer Health Activities and Professions Exploration (sHaPe). This camp is designed to provide middle school students with the opportunity to explore careers in the health sciences, participate in hands-on science activities that include laboratories and simulations, gain academically challenging scientific knowledge, learn about personal health and fitness, understand and develop compassion for those with disabilities, and have a positive exposure to a college experience in a safe setting.

  Strategic recruitment in the greater Grand Rapids area resulted in a racially diverse camp with 28% African American, 22% Hispanic, 11% Multi-Racial, 4% Asian, and 2% American Indian. On a pre/post test on content related to camp experiences around health professions, students showed an increase of 3.5 points (on a scale of 10 items) which is a statistically significant gain.

- **Discovering STEM Kit Program:** Priority Schools (North Godwin Heights and Aberdeen Elementary) and other underperforming schools were also reached through our Discovering STEM kits lending program. In addition, the kits were used by the GRPS LOOP afterschool program and the Cook Library Scholars program. Both programs service students from schools with high minority populations.

  The use of the kits for family STEM/Science/Math Nights heighten student and teachers' interest in STEM education and also improve the quality of science and mathematics education. They encourage teachers to find new and exciting ways to teach STEM to young children and emphasize hands-on experiences. All activities emphasize participation, teamwork, and cooperation in a non-competitive environment. The total number of students reached through this program this year was 3,280, with 41% of that number being from minority populations.

**Closing the Achievement Gap—Teachers:**

- **Project PRIME Plus:** Through PRIME Plus, the RMSC was able to provide professional learning to over 80 secondary mathematics and special education teachers in several underperforming districts in Kent, Ottawa and Montcalm Counties. Data on teacher pre/post testing was cited earlier in this report. Focus schools represented in this group of teachers included Harbor Lights Middle School, and Macatawa Bay Middle School.

# *Spotlight on Partnerships*

The GVSU Regional Math and Science Center collaborates with a variety of stakeholders in our region. These collaborations occur both internally with colleges, departments, faculty, and staff at GVSU and externally with other educational institutions, businesses, and community organizations in our region. Partnerships of this kind are essential in leveraging both human and physical resources for the work of the Center and the benefit of students and teachers in our region.

Collaborations within GVSU: This year was one of multiple collaborations within the university to provide students and teachers with excellent opportunities around STEM education:

- **Department of Statistics:** With 2013 being the International Year of Statistics, the RMSC partnered with Dr. Neal Rogness of the Statistics Department in providing *Super STAT-urday* to area middle grades students. This included the writing and receiving of a grant from the Michigan Space Grant Consortium.
- **Department of Chemistry:** Over the course of the year, we supported Dr. Dalila Kovacs by providing Green Chemistry workshops (both face to face and online) to secondary teachers in West Michigan.
- **Department of Mathematics:**
    - Math Fellows: New this year was the much appreciated allocation of mathematics faculty time provided by the CLAS (College of Liberal Arts and Sciences) Dean to work at the RMSC. As a result, GVSU faculty were instrumental in developing a workshop for elementary teachers on "math talk" and the mathematics kits that were added to the Discovery STEM kit program.
    - Math-Team-Matics: Also new this year was this fun and friendly competition for secondary students featuring creative and engaging problems to bring the mathematical practices to life and challenge the knowledge and understanding of competitors. Content for the competition is drawn from K-8 mathematics, high school algebra, and high school geometry. Partners included mathematics faculty and GVSU students.
    - Math in Action: Each year the RSMC co-sponsors the Math in Action Conference for K-12 educators. This conference presents lively and informative discussions of current issues in mathematics education while providing an opportunity for practicing Pre-K–12 teachers, prospective teachers, curriculum directors, and college and university faculty to share ideas, concerns, and resources.
- **College of Education:** The Regional Mathematics and Science Center is a critical partner in the professional learning provided by the Groundswell program available to schools in Kent County through grants held from the Great Lakes Stewardship Initiative and the DEQ. Groundswell helps inform teachers and students how to address Michigan watershed and environmental issues while engaging in service learning projects.
- **College of Health Professions:** The faculty and staff of this college devote time and resources each summer for our sHaPe Camp described earlier in this report.

Collaborations External to GVSU:

- **Michigan STEM Partnership:** For part of this year, the RMSC Director served as liaison to the State Board; then continued serving our stakeholders as co-chair of the Lake MI Hub of the Partnership. The RMSC also collaborated with groups in our region in applying for STEM grants made available through the Partnership.
- **RMSC Advisory Board:** The Advisory Board from our Center is composed of stakeholders from various sectors (higher education outside of GVSU, business and industry, ISDs). This group informs the work of the Center and assists in the development of our strategic plan.
- **Business/Industry Partners:** We rely on our business and industry partners to assist us in providing real-world context for students and teachers. For example, our partnership with Mercy Health provides a hospitable based experience for our sHaPe campers. Industry partners also provide event supervisors for the Region 12 Science Olympiad competition.

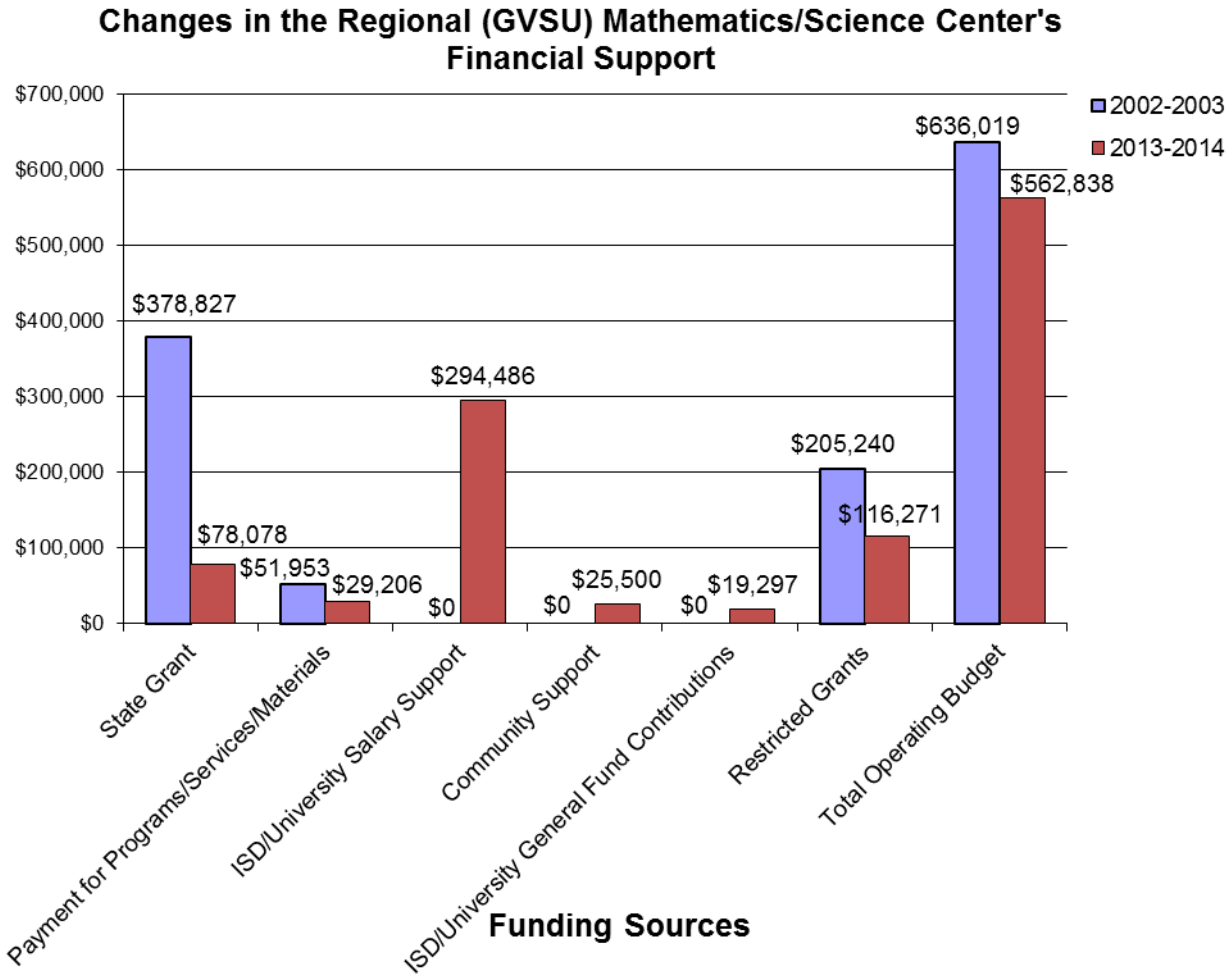
# Director's 2013-2014 Budget Discussion

Funding for the RMSC remains relatively stable, although still at a much lower level than a decade ago. Since 2004, when state funding of the thirty-three Mathematics and Science Centers was cut by 75%, Grand Valley State University has provided the major portion of the Regional Math and Science Center's budget, making it possible to maintain close to full staffing levels. Until the fall of 2009, participant fees, gifts and donations from individuals and businesses allowed the Center to operate at almost full capacity. However, in 2009-2010 the Mathematics and Science Centers' funding was cut an additional 25%. At that time Grand Valley was not able to assume this portion of our funding. Consequently, we continue to face the challenge of maintaining our teacher professional learning and/or student services programs at their previous levels.

During the 2013-2014 fiscal year, the Center staff has brought in approximately $116,271 in restricted grants. We also received approximately $562,995 in in-kind contributions of donated time, facilities, and equipment) from our University and the community to provide student programs and teacher professional learning. The partnership, highlighted earlier in the report, also allow us to maintain a high level of services for our region. This ability to leverage funds speaks to the efficiency and efficacy of the Mathematics and Science Centers.

Again, this past year there was an opportunity for the Mathematics and Science Centers to receive additional funding for special professional learning programming such as PRIME Plus and SaM$^3$, but the funds were not available for general operations or to pay staff. The additional funding required us to provide services over and above those included in the strategic plan. These services require extensive work and time commitment that added to the work load of an already stretched staff.

The University is facing major budget constraints itself, and therefore, its current level of support for the Center is not guaranteed indefinitely. If the State of Michigan's support for universities is maintained and/or the full funding for the Mathematics and Science Center program is reinstated, then the RMSC will flourish.




In addition to the financial support illustrated in the graph above, “in-kind” services received by the Center (donated time, facilities, or equipment) were valued at $562,995.

# Director's Summary 2013-2014

The 2013-2014 year has been a productive year for the RMSC on the state, regional, and local levels. Both continuing and new initiatives that include:

- Providing quality professional learning opportunities for area teachers around the development and implementation of the CCSS (mathematics and science literacy standards) and the science and engineering practices of the NGSS.
- Collaborating with GVSU faculty to provide opportunities for both teachers and students in STEM fields.
- Offering opportunities for students to engage in activities that build both excitement for STEM and build content knowledge in STEM disciplines such as Discovering STEM Kit Program, Science Olympiad, sHaPe Camp, *Super STAT-urday* and G3 (Grandparents, Grandkids, Grand Valley).

The RMSC participated in several statewide initiatives developed through the Michigan Mathematics and Science Centers Network. The RMSC was one of the professional learning hubs for Project PRIME Plus delivering professional learning for over 80 teachers. This included providing facilitators and coaches as well as arranging for space, materials, food, and technology to meet the requirements of the program directors. Other Network-wide programs that the RMSC was involved in included SaM$^3$, NGSx training, and Modeling summer academies. In addition, the Center Director represented the MMSCN on the NGSS Internal Review Team for the State of Michigan, and carried out responsibilities as Secretary for the MMSCN. The Director of the RMSC was active in the Lake Michigan Hub of the Michigan STEM Partnership as the liaison to the State Steering Committee/Board and later as the Co-Chair of the Hub.

Since most of our funding came from Grand Valley in 2013-2014, it has continued to be important that the RMSC clearly serve the mission of the University, in addition to maintaining its commitment and integrity to the work outlined by the Mathematics and Science Center Master Plan, Michigan Legislature, and Michigan Department of Education. During the past academic year, we have maintained our role as the academic office for the Integrated Science major, which is a teacher preparation major. This relationship provides the opportunity for the Center to collaborate with STEM faculty on issues of K-12 education and to provide activities for student teachers to interact with programs aimed at K-12 students.

As the RMSC looks to the future, our current challenge is to continue to meet the needs of our entire local constituency as we endeavor to meet State expectations for increased involvement in statewide programs and give priority to persistently low achieving schools in our region. Our Dean continues to be very supportive of the RMSC by attending our events, providing financial resources, representing the Center to central administration, and promoting opportunities for us to fulfill our mission.

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