


5-10-2016

STEM Community Chairs Progress Updates Spring 2016

UNO STEM Leadership Team
University of Nebraska at Omaha

Follow this and additional works at: <https://digitalcommons.unomaha.edu/oiestudentlearning>

 Part of the [Higher Education Administration Commons](#), and the [Science and Mathematics Education Commons](#)

Please take our feedback survey at: https://unomaha.az1.qualtrics.com/jfe/form/SV_8cchtFmpDyGfBLE

Recommended Citation

STEM Leadership Team, UNO, "STEM Community Chairs Progress Updates Spring 2016" (2016). *Student Learning*. 30.

<https://digitalcommons.unomaha.edu/oiestudentlearning/30>

This Report is brought to you for free and open access by the Portfolio/Visit 2016-18 at DigitalCommons@UNO. It has been accepted for inclusion in Student Learning by an authorized administrator of DigitalCommons@UNO. For more information, please contact unodigitalcommons@unomaha.edu.

Brief Update of Activities and Progress: May 11, 2016
Dr. George and Sally Haddix Community Chair of STEM Education

The following is a brief update of the activities and efforts being undertaken by UNO's Dr. George and Sally Haddix Community Chair of STEM Education as being held by Dr. Neal Grandgenett. The goal of this position is:



Position Goal: To organize, lead and inspire collaborative STEM initiatives at UNO, that cross colleges and disciplines, and that aggressively position UNO to be a true national leader in interdisciplinary STEM programs. (Curriculum, Capacity, Collaboration)

Curriculum Initiatives Accomplished / Underway

1. Continuing Glacier Creek Efforts for STEM Teachers

We have successfully further expanded efforts at Glacier Creek to support STEM teachers and particularly elementary. This has involved the following:

- More course offerings for elementary teachers: Inquiry-Based Learning in STEM
- New STEM graduate course: Ecosystem Analysis for Educators
- Fulltime Hubbard Glacier Creek STEM Learning Instructor in place
- Lots of teacher professional development at the site (recently 80 OPS teachers)



2. Building Community Efforts for a Citywide STEM Ecosystem Effort.

We are increasing community partnerships for STEM Initiatives in a new organization, co-led by UNO and the Zoo, which:

- Involving 30+ organizations to formalize an Omaha Citywide STEM Ecosystem
- Finding initial funding for hiring a new full time director of the ecosystem
- Completing a successful proposal to join the national STEM Funders Network
- Helping to co-lead and organizational charter and organize partner financial contributions



3. Expanding B.S. and M.S. Pathways in the STEM Disciplines Leading to Teacher Certification

This important initiative is continuing very well. We have now established pathways for math, physics, chemistry, and a supplemental endorsement in computer science as well as a collaborative MS Ed in CS.



- We have 28 undergraduate students in the Math pathway (five just graduated!)
- We have 3 in the Chemistry and 2 in the Physics pipelines
- Pathways led to earlier NSF Noyce Scholarship Grant for Math (Hodge, PI)
- We will soon submit a NSF Noyce Proposal for Science (Cutucache, PI)
- We created a CS supplemental endorsement (18 hours grad/undergrad)
- We have a new CS MS Ed in final review to support UNO dual enrollment
- We are updating and developing STEM classes in blended learning formats

Capacity Building Initiatives Accomplished / Underway

4. We are working on a STEM prefix for courses, particularly at the graduate level

Status: With STEM Departments across campus we are starting to work on a STEM prefix that can help teachers find the needed courses for graduate credit, in both content and pedagogy. It has considerable support from STEM faculty leaders. Such a prefix will particularly help:



- 1) Departments such as Chemistry to offer graduate courses for teachers, with minimal politics
- 2) The Department of Teacher Education to offer graduate courses in K12 Engineering
- 3) The establishment of interdisciplinary graduate courses for teachers, such as Bioinformatics
- 4) Allow prefix mechanisms where resources would flow to the instructor and department
- 5) Help to establish a "UNO STEM Certificate" that could eventually be offered to teachers
- 6) Bring in more external funding from NSF programs targeting STEM reforms for teachers
- 7) Establishing increased STEM innovation with courses that are increasingly collaborative

5. Summary of STEM Personnel Successes: New Experts Helping to Row the STEM Boat!

Status: We have had some significant successes in building STEM capacity by innovative approaches to collaborative funding and position development efforts.

- Glacier Creek STEM Learning Instructor Hired 2015 (Hubbard Foundation, A&S Match)
- Position of Excellence Professor Hired 2016 (STEM and Early Childhood; NU funding)
- Faculty Discipline-Based Education Researcher Hired 2016 (CS/Science Education, COE funding)
- Omaha Citywide STEM Ecosystem System Director Posted (UNO/Funder Match for First Year)

Also, Thank you Dr. Haddix! We are now working with the Chemistry and Physics Departments to develop the position visioning, search mechanisms, and hiring protocols for the new Dr. George F. Haddix Community Chair in Physical Science! Everyone is so excited, as this will really help us to move forward with building initiatives in STEM Education with a base in Chemistry and Physics, but also across all STEM collaborations!



6. New and Continued Successes in collaborative STEM Funding

Funded: Collaborative STEM Grants Funded and Led By Community Chairs: (Titles Shortened)

- Girls Inc.: Training Middle School Girls in STEM (\$80,000: Hodge, Mitchell)
- NSF Noyce Math Education Scholarships (\$1.1 M: Hodge, Rech, Matthews, Ostler, Grandgenett)
- NSF ITEST: Strategic PBL to Rouse CS (\$1.1 M: Siy, Dorn, Zhu, Grandgenett, Youn)
- NSF ITEST: Wearable Technology in STEM (\$1.2 M: Barker-UNL 4H & Grandgenett-UNO)
- Sherwood: OPS/UNO Science Innovations (\$4.2 M: Cutucache, Grandgenett)
- Sherwood: Teacher Research (\$628,208: Cutucache, Tapprich, Shuster, Rhodie, Grandgenett)
- Sherwood: NE STEM 4U \$106,877: Cutucache, Grandgenett, Tapprich)
- Peter Kiewit Foundation: NE STEM 4U (\$18,000: Cutucache, Grandgenett, Tapprich)
- Nebraska Research Initiatives: STEM Teaching, Mentoring, Ethics (\$99,800: Tapprich, Cutucache, Nelson, Talmon) - *Collaborative with UNMC*
- Online World Wide: CS Education Coursework (\$35,000: Zhu, Dorn, Siy, Youn, Grandgenett)

Collaboration and Dissemination Initiatives Accomplished

7. Selected Community Chair Led Publications and Presentations:



1. Tapprich, W., Grandgenett, N., Leas, H., Rhodie, S., Shuster, R., Schaben, C., Cutucache, C. (2016). Enhancing the STEM Ecosystem through Teacher Researcher-Partnerships. *The Metropolitan Universities Journal*, Volume 27 (1), 2016, pages 71-85.
2. Cutucache, C., Luhr, J., Tapprich, W., Grandgenett, N. (2016). NE STEM 4U: An out-of-school time academic program to improve achievement of disadvantaged youth in STEM areas (2016). *International Journal of STEM Education*, 3(1), 1-7.
3. Barker, B.S., Nugent, G., Grandgenett, N., Keshwani, J., Nelson, C., Leduc-Mills, B. (2016). Developing an Elementary Engineering Education Program through Problem-Based Wearable Technology Activities. In Janet Holland's (Editor) *Wearable Technology and Mobile Innovations for Next-Generation Education*, IGI Global: Hershey, Pennsylvania.
4. Dorn B. and Tew, A. Empirical Validation and Application of the Computing Attitudes Survey. (2015). *Computer Science Education*, 25(1).
5. Grandgenett, N., Edick, N., Boocker, D., Ali, H., Hodge, A., Dorn, B., Cutucache, C. (2015). Community Chairs as a Catalyst for Campus Collaborations in STEM. *The Metropolitan Universities Journal*, Volume 26 (1), 2015, 50-59.
6. Ernst, D., Hodge, A., Schultz, A. (2015). Inquiry-based collaborative peer review in an abstract algebra course. *PRIMUS: Problems, Resources, and Issues in Math Undergraduate Studies* 25(2), 121-130.
7. Dorn, B., Babb, D., Nizzi D., and Epler, C. (2015). Computing on the Silicon Prairie: The State of CS in Nebraska Public Schools In *SIGCSE'15: Proceedings of the 46th SIGCSE Technical Symposium on Computer Science Education*, pages 296-301, 2015.
8. Dorn, B., Baab, D., Boyer, W., Carr, S., Grandgenett, N., Haverty, P., Knecht, J., Knutson, J., Nizzi, D., Siy, H. Soh, L. (2015). K-12 Computer Science and IT Education in Nebraska Public Schools: Increasing Exposure and Access. *Presentation to the Nebraska State Board of Education*, November 7, 2015.
9. Love, B., Hodge, A., Corritore, C., Ernst, D. (2015). Inquiry-based learning and the flipped classroom. *Primus: Problems, Resources and Issues in Math Undergraduate Studies*, 25(8), 745-762.
10. Shukla A, **Cutucache CE**, Opavsky R, Swanson PC, Joshi SS. 2016. *Absence of caveolin-1 leads to delayed development of chronic lymphocytic leukemia in Emu-TCL1 mouse model*. *Experimental Hematology* doi:10.1016/j.exphem.2015.09.005.
11. Helikar T., **Cutucache C.E.**, Dahlquist L.M., Herek T., Larson J.J., Rogers J. (2015) Integrating interactive computational modeling in biology curricula. *PLoS Computational Biology*. 11(3): e1004131

8. Enhancing Informal Education Partnerships (Examples)

Status: We are steadily expanding the STEM Outreach Events. Some key UNO STEM events include:

Nebraska Science Festival; Nebraska Robotics Expo; River City Rodeo STEM; Collective For Youth Lights On; Code Crush and IT Innovation Cup; Calculus Bee; Girls Inc. Eureka Camp; UNO Open Houses; Nebraska Metropolitan Science and Engineering Fair; Kiewit Engineering Day; The Magic of Chemistry; Nebraska Association of the Gifted Showcase; Nebraska Teacher Professional Development Series; Strategic Air and Space Museum STEM Conference; Celebration of the Mind; Bioblitz; Partnership for Kids; NE 4H Extension; Science Olympiad.

Haddix Community Chair of Science

The following is a brief update of the activities and efforts being undertaken and supported by Dr. Christine Cutucache in the role of the Haddix Community Chair of Science position. The vision of this position is to *provide leadership and expertise in STEM education within Science. Additionally, to serve as an interdisciplinary resource promoting STEM education across the natural sciences, collaborate with other STEM chairs, and work closely with education faculty and community partners to address critical matters of K-12 STEM education in metropolitan Omaha.* A brief summary is included below.



I. Sample Contributions to COMMUNITY and AREA YOUTH

- ***NE STEM 4U:*** Provided after school, informal programming for >2,000 youth in Omaha Public Schools with the greatest economic need by organizing, supervising and engaging 60+ STEM student majors at UNO.
- ***STEM Ecosystem:*** Ongoing planning and organization of the Omaha City-wide STEM Ecosystem. This would be a national model aimed at providing sustainable, expanded learning opportunities with partnerships between the University, Industry, and Local Organizations (e.g. Henry Doorly Zoo, Collective for Youth, Completely Kids, etc) to provide a cohesive infrastructure and leadership for STEM at a city-wide (and, eventually, state-wide level)
- Participated in organizing and sponsoring ***LightsOn After School*** (October, annually). This is a national event as part of the Afterschool Alliance where we work through NE STEM 4U with the city agency, Collective for Youth, to provide activities for youth to engage in STEM (last attendance was over 2,000 youth)
- ***DNA Day-National Institutes of Health Highlight:*** Our organization, NE STEM 4U, was selected by the National Institutes of Health (NIH) to be highlighted as a model program nationally for DNA Day. Essentially, they broadcast our events, provide press for us (for free), and provided advertising material
- ***Nebraska Science Policy Summit (Lincoln, NE):*** Invited keynote speaker by Regent Whitehouse and Beyond School Bells to deliver talk about NE STEM 4U at UNO
- ***Women's Fund of Omaha Circles Program:*** The Women's Fund of Omaha and Nebraskans for Civic Reform identified 4 women in Omaha to serve as speakers and role models for area youth as well as their teachers and staff in a coaching model. I was selected as such a speaker and have been working with female students at Marrs and Lewis and Clark (and their teachers).

II. Sample Contributions to STUDENTS (Undergraduate & graduate)

- Mentored 5 undergraduates in biomedical research and discipline-based education research resulting in 5 accepted publications (with student authors) and a total of 4 awarded grants to students
- Mentored 4 graduate students (Nelson, Herek, Garudeswaran, Sabel) toward M.S. and Ph.D. degrees in biomedical research (T. Herek and S. Garudeswaran) and discipline-based education research (K. Nelson & J. Sabel)
- Supported travel and presentation needs of graduate students and faculty from labs in the Department of Biology to meet their aspirations of presenting their work at a national or international venues

III. Sample Contributions to TEACHERS

- Lead UNO CoPI on the \$4.2M K-12 Comprehensive Science Teaching and Learning Grant with Omaha Public Schools. Grant strives to build teacher quality in the science disciplines (through 2018)

- PI on a funded \$628,208 Teacher-Researcher Training Program (2015-2018) with OPS (including hosting a teacher in my research lab every summer). Pilot year engaged 11 teachers and 11 UNO mentor scientists in collaborative research.
- Advocacy committee member for the Hubbard STEM Learning Instructor (a new hire dedicated to providing teacher training in the sciences), and helping to establish new coursework options at Glacier Creek for P12 teachers.
- Serve as the main UNO liaison to OPS for science needs and instructional planning
- Member of the Midwest Science and Engineering Fair and Nebraska Academy of Sciences
- Will begin the mentorship of a teacher toward a M.S. in Biology this fall, 2016

IV. *Sample Contributions to FACULTY*

- Supported travel for student researchers invited to deliver presentations on their work in the sciences
- Supported Communities of Practice focused on improving DBER in the sciences (COP-Chemistry)
- Supported structure expansion for the Department of Biology by hiring an assistant off of a grant to be a staff associate role for Biology and NE STEM 4U (continued)
- Expanded faculty collaborations at UNK (through ongoing discussions and grant reviewing for faculty in Biology) to boost the STEM footprint in Nebraska
- Supported BioBits (a quarterly newsletter of faculty accomplishments in Biology)

V. *Sample Contributions to UNIVERSITY*

- Collaborated with faculty across colleges to support STEM-related manuscripts and grants in areas of discipline-based education research (DBER)
- Supported faculty across colleges to attain funding support toward biomedical research-including securing a flow cytometer for clinical work, community engagement, and use in courses at UNO with Dr. Bill Tapprich (importantly, this is the first, and only, on campus)
- Working toward a STEM Inventory
- Facilitated a Strategic Plan for the UNO Aim for the Stars Program (continued)
- Grants submitted (this is a service to faculty, the university, and the profession):
 - Peter Kiewit Foundation (2015-2016) *NE STEM 4U: Programming for elementary schools. Partnership with Collective for Youth* (PI: C. Cutucache; CoPIs: N. Grandgenett, W. Tapprich) \$18,000- **FUNDED**
 - The Sherwood Foundation (2015-2016) *NE STEM 4U: After school STEM outreach in OPS* (PI: C. Cutucache; Co-PIs: William Tapprich & Neal Grandgenett) F&A 10% \$106,877- **FUNDED**
 - NSF AISL (Re-Submitted Oct 2015) *NE STEM 4U: Advancing Knowledge and Broadening Participation in Science* (PI: C. Cutucache; Co-PIs: Neal Grandgenett & William Tapprich) \$1,999,596-3rd resubmission
 - Prepared an NSF Noyce with a team of Science Faculty (with guidance and assistance from A. Hodge, N. Grandgenett, and M. Matthews to build on Math's success) for submission as soon as the RFP is released by NSF: *The NebraskaSCIENCE Omaha Noyce Partnership, a Track I Robert Noyce Teacher Scholarship Program*. (PI: C. Cutucache, CoPIs: Neal Grandgenett, John Conrad, William Tapprich, R. Sabirianov; Senior Personnel: R. Shuster, M. Matthews, A. Hodge, J. Darr, R. Lomneth)

VI. *Sample Contributions to PROFESSION*

- Invited Guest Editor for *Frontiers Oncology* (2015-present)
- Invited Guest Editor for *Frontiers Immunology* (2016-present)

- Elected Councilor in the Council of Undergraduate Research (CUR)
- Member of task force of CUR Internationalization of Research committee
- Reviewer for International Immunopharmacology, Journal of Molecular Biological Sciences
- Delivered presentation (and contributed to a publication) at the Coalition of Urban and Metropolitan Universities meeting, October 2015: Omaha, NE
- Six (6) publications in 2015-early 2016 (3 more invited manuscripts, May 2, 2016)

Brief Update of Activities and Progress: April 12th, 2016

Dr. George Haddix Community Chair in Mathematics

The following is a brief update of the activities and efforts being undertaken by UNO's Dr. George Haddix Community Chair in Mathematics as being held by Dr. Angie Hodge. The Haddix Chair in Mathematics works with the following purpose: *To provide leadership and resources for the Mathematics Department, in cooperation with the College of Education, to address the critical shortage of well trained secondary mathematics teachers in the metro Omaha area and to place UNO at the forefront of professional innovation in the preparation of mathematics teachers.*

Sampling of Major Current Initiatives and Major Accomplishments of Initiatives

1. **Actively Learning Math (PI)** (Association for Public and Land Grant Universities, \$32,644)

Status: Funded with a no cost extension until December 2016. The last year's funds coupled with Haddix funds have allowed me to travel to the University of Colorado Boulder to continue the creation and refinement of Active Learning Calculus Materials.



Dr. Rech and I have been working on designing an active learning calculus sequence for the past three years. This past year we have had great success in seeing efforts come together with the help of a partnership with the University of Colorado Boulder and the fact that our work in calculus is now receiving national recognition for both teacher education and for other STEM majors. In addition to several presentations, workshops, and nationwide mentoring of calculus, here are some of our more notable accomplishments.

- Special Projects Coordinator for the Academy of Inquiry-Based Learning (Hodge)
- Hosted Hosei University faculty member, Mr. Yasuda, to observe IBL classroom (Spring 2016 – Rech)
- Invited to lead an AP workshop for high school calculus teachers in Washington (Summer 2016 - Rech)
- Invited to present at active learning workshop for STEM faculty at St. Edward's University (2016 – Hodge)
- Led an invited active learning calculus workshop at the National Conference of Teachers' of Mathematics annual meeting in Boston, MA (April, 2015 – Hodge and Rech)
- Organized three full days of active learning talks at the JMM 2015 in San Antonio, TX (Hodge)
- Invited opening keynote speaker on Active Learning Calculus for the 18th Annual R.L. Moore Legacy Conference in Austin, TX (June 2015) - Hodge presented joint work done with Rech and CU Boulder partners
- Mentored four UNO undergraduate mathematics students who led a panel discussion on active calculus
- Mentored four UNO undergraduate mathematics students who were interviewed as part of a nationwide effort to learn more about active learning calculus (June 2015)
- Dr. Kayla Dwelle visited Rech and Hodge's active learning calculus classes on her sabbatical (Fall 2015)
- Leaders in creation of active learning calculus materials (Hodge, Rech, and CU Boulder partners)
- Leaders in the MTEP (Math Teacher Education Partnership) on active learning calculus
- Creation of Active Learning Calculus website: <http://math.colorado.edu/activecalc/> (Fall 2015)
- Creation of daily classroom materials/worksheets for Active Learning Calculus I and Active Learning Calculus II (to be completed spring 2016 and ready for full pilot in fall 2016 – spring 2016)
- Creation of TACTivies for Active Learning Calculus I and Active Learning Calculus II

Next Steps: Submit Nebraska Teacher Quality grant on active learning calculus for high school teachers (fall 2016)

Refine materials and update website with creative commons, so the materials can be shared with others.

Analyze data from active learning calculus and publish findings from active learning calculus.

- 2. Girls. Inc – Eureka!-STEM Project (PI)** (Girls Inc., Funded \$38,556 - 2012, \$70,000 - 2013, \$70,000 for 2014, \$70,000 for 2015; \$80,000 for 2016)
Status: Our once new EUREKA!-STEM camp is now a regular event. It has also sustained a change in faculty and continues to improve with each year.

UNO hosted the 4 week summer camp for 28 girls in 2012, 58 girls in 2013, 58 girls in 2014, and 58 girls in 2015. The camp is focused on STEM, physical activity, and overall well-being of the girls. The girls spend over half of their time at the camp engaged in inquiry-based STEM activities led by UNO faculty and students with the hopes that the girls will later pursue careers in STEM. This year 25 more girls will be on campus for our fourth year of the camp. The 2012-2014 girls will continue the program at Girls. Inc.

http://www.youtube.com/watch?v=dT_hE5t2IiI

Next Steps: Follow up on the girls who will be seniors in high school this year to see their future career plans. Refine research done on the camp: collect and analyze data accordingly.

3. NSF NOYCE Project: Nebraska Math Omaha NOYCE Partnership (PI)

Status: Funded by NSF for \$1,199,059, Colleges of Arts and Science and Education. Project funds scholarships for B.S. in Mathematics leading to teacher certification and internships to recruit students into secondary mathematics education.

- Provided scholarships (of up to \$15,000 per student depending on need) to 9 UNO students (2015-2017)
 - Three out of our 4 original scholars returned as scholars for a second year in 2016.
- Provided summer internships (of up to \$4,000 per student) to 6 students in 2015-2016
- Two of our 6 interns from summer 2015 are current scholars and an additional 2 students as returning interns.
- Awarded 8 students internships (of up to \$4,000 per student) for 2016-2017.
 - Two of these interns are Metro Community College students who we hope to recruit to UNO

Noyce Scholars

- Scholars agree to teach for at least two years in a high needs school for each year of the scholarship received.
- Scholars are paired with a UNO faculty mentor from mathematics/mathematics education/STEM education

Noyce Interns

- Our interns are exploring a career in mathematics education by engaging in a 6 week summer internship
 - Interns work full time for four weeks at the EUREKA!-STEM camp for middle school girls.
 - Interns work for two weeks in a NEBRASKA-MATH course in partnership with UNO faculty, UNL faculty, and OPS teachers.

Shared experiences

Interns and scholars engage in regular culturally relevant pedagogy activities to prepare them to teach in high need schools.

- Participation at culturally relevant teaching seminars led by UNO mathematics education faculty
- Leading projects such as the Latino Leaders project at area schools
- Participation in carefully selected placements at high needs school

Leadership experiences

Interns and scholars lead projects that will help them become teacher leaders in mathematics education

- Provide calculus tutoring to UNO students
- Provide tutoring at the Open Door Mission
- Bricklayer coding help desk work
- Assist the STEM outreach coordinator at events such as SciFest and the Robotics Expo
- Help organize and lead events such as the Calculus Bee and the High School Math Competition
- Lead STEMathematics booths at after school events (from Kindergarten events to dual enrollment events)
- Work with me (the advisor of the Math Club) to lead UNO Math Club events
- Attend both mathematics and mathematics education conferences and lead sessions at such events

New and on-going collaborative efforts

Continued efforts to create an active mathematics/mathematics education community

- Advisor of the UNO Math Club
 - Organizes both social and academic events for the mathematics department
- Math department colloquium organizer
- Organizer of Meet your Professor Talks
- Organizer of Cool Math Talks
- Organizer of Math Teachers' Circles
- Co-organizer of Calculus Teachers' Circles
- Helper at Dual Enrollment recruiting events
- Helper at High School Math Competition
 - Fall event that brings about 700 high school students to UNO to compete in an all day event
- Creator of Calculus the Musical and the Calculus Bee
 - Now an official committee in the mathematics leads these efforts
 - Fall Calculus Bee held at UNO for UNO students
 - Spring musical and bee held at Baxter arena (1,000 students at the musical and 700 at the bee)
- Organizing booths at outreach events
 - SciFest (workshops and booth)
 - P4K Blast! STEM for Teens
 - Student Involvement Fair
 - Celebration of Minds Nebraska

Notable new initiatives

These initiatives were piloted in 2015-2016 using Haddix funds. We hope to secure funding so these can grow.

- Math Journal Club
- Math Student Circles
- Noyce mentoring
- Calculus workshops
- LaTeX writing – students and myself are beginning to learn to write using this coding system

Leading from the middle (projects in the making)

- Active learning trigonometry – UNO/UNL partnership effort (Matthews/Hodge – UNO; Wakefield – UNL)
- Bricklayer coding – UNO mathematics, mathematics education, and computer science partnership
- Cross-campus collaborative efforts on a possible STEM master's degree for elementary teachers
- College of Arts and Science Diversity Committee
- WiSTEM (Women in STEM) faculty leadership committee

Nationwide recognition of UNO's teacher leadership/curriculum efforts continues

- Math Horizons journal – invited editorial board member
- Invited new teacher workshop leader and panelist at National Conference of Teachers of Mathematics 2016
- Mathematical Association of America Blog MathEd Matters: <http://maamathedmatters.blogspot.com/>
- Invited panelist at the Inquiry-Based Learning MathFest Pre-session in Columbus, OH (August, 2016)
- National leader in Math Teachers' Circles: Invited traveling mentor for new Math Teachers' Circles around the nation (Helena, Montana trip planned for April 2016 and Jackson, Mississippi for June 2016).
- National inquiry-based learning workshop leader mentor – will teach people how to run national workshops on inquiry-based learning as part of a nationwide effort to transform undergraduate mathematics education. (Trained leaders in February 2016 and will supervise workshop in July 2016)
- Kudos to Dylan King and Miracle Kanu-Asiegbu for receiving highly competitive Research Experiences for Undergraduates (REU's) at Michigan State and Florida State respectively (both students mentored by Haddix Chairs –Hodge and Grandgenett)! (200-500 students apply for each REU)

Thank you, Dr. Haddix, for your support of these efforts!

Brief Update of Activities and Progress: May 17, 2016
Union Pacific Community Chair of Computer Science Education

The following is a brief update of the activities and efforts being undertaken and supported by Dr. Brian Dorn, who holds the Union Pacific Community Chair of Computer Science. Similar to other Community Chair positions on campus, the goals of this position are to: *provide leadership in the College of Information Science and Technology and the campus relating to STEM, maintain a strong research emphasis in computing and the pedagogical issues associated with STEM education in computing, and interact with external stakeholders to advance the state of computing education.*



Significant New Initiatives During 2015-2016

Computer Science Learning Center -- Starting in August 2015 we established the new CSLC in PKI to assist undergraduate students enrolled in nearly a dozen different foundational courses across the IS&T majors and their equivalent courses at Metro Community College. These courses are also heavily utilized by PKI Engineering programs and for A&S majors. In total we provided approximately 200 tutoring hours per week and served thousands of students via walk-in, private, and web-based tutoring during this academic year. In the coming year, we will scale up further to support area high school students and teachers in Advanced Placement courses.

Funding Awarded: US Department of Labor. H1B: *Nebraska's IT Educational Pathway*. \$9,162,680. (Dorn with NE Dept of Labor and Metro Community College)

Strategic Problem-based Approach to Rouse Computer Science (SPARCS) – We have recently completed our first year cohort of 16 middle school teachers learning to integrate computer science elements into core content lessons in Mathematics, Science, and Computer Applications. The year 2 cohort will consist of 16-18 teachers and will begin the program during June 2016. Initial results show positive growth in terms of teacher comfort with computing concepts and largely effective deployments of the lessons during AY15-16. Modifications to the training model are under way to account for lessons learned.

Funding Awarded: NSF: *Strategic Problem-based Approach to Rouse Computer Science (SPARCS)*. \$1,144,424 (Siy, Dorn, Grandgenett, Youn, Zhu)

Masters of Science in Computer Science Education – As mentioned last year, we are continuing our efforts to establish a one-of-a-kind MS degree in CS Education for cross-training in-service teachers into the CS discipline. Our efforts this year have been in completing the necessary approval stages both locally and system-wide. The external review team meetings held in late April 2016 went very well, and we anticipate the program will come up for vote at a summer 2016 Board of Regents meeting.

We have also begun offering the initial CS Teacher Education (CSTE) courses needed for this program as well as the in-service graduate IT Supplemental Endorsement pathway. In total 3 new courses CSTE8020, 8030, and 8040 were designed and offered during this academic year.

Funding Awarded: Nebraska Online Worldwide. *Online Master of Science Degree in Computer Science Education (MS-CSE)*. \$35,000. (Zhu, Dorn, Siy, Grandgenett, Youn, Lentfer) – supports course development needed for the MS program

Funding Awarded: Sherwood Foundation. *Enhancing Computer Science Education Graduate Program Pathways for K-12 Teachers*. \$94,769. (Khazanchi and Dorn) – provides graduate tuition fellowships for OPS teachers enrolling in the new MS program during AY16-17.

CS4HS@UNO– Starting this summer and continuing through AY16-17, we will be working with a cohort of approximately 18 high school teachers across the region to build interest in the new AP CS Principles course, which will go live this coming year. This project aims to expose teachers to introductory lessons from the Mobile CSP curriculum and build their confidence in offering it at their schools. We continue the experience with ongoing PD opportunities and 1-1 mentoring in schools during the academic year. We are excited to offer additional support for rural teachers from outside the Omaha area to attend the workshops, which will expand the impact that our CSEd team can have in our region.

Funding Awarded: Google. \$35,000. (Zhu, Dorn, Siy, and Youn).

Code.org K-12 Framework Advisor – Code.org has become a force in the national K-12 computing education landscape over the last two years, with support from major IT sector players. Their advocacy work with Congress and the White House has been instrumental in President Obama’s January 2016 “CS for All” initiative, which would support efforts in schools with over \$4 billion in grant funding. During 2015-2016, Code.org has convened a team of writers and advisors to develop a curriculum framework document that would help guide states and districts in their local efforts to identify age-appropriate educational standards. I currently serve on the advisory board along with computing education experts from around the US.

Nebraska IT Standards Revision – Following our November 2015 testimony to the NE State Board of Education, leaders at NDE have begun a standards revision process to modernize our curriculum standards for the Communications and Information Systems career field. I have been an active participant in the visioning process (December 2015) and in the initial standards creation (May 2016), with the expectation that this work will continue into next academic year.

ICER Conference – During August 2016, I chaired the annual International Computing Education Research (ICER) conference in Omaha. ICER is recognized as the premier venue for Discipline Based Education Research among computing researchers. UNO was host to the largest ICER conference in history, and had the most competitive selection process for research contributions. I’m pleased to serve on the ICER 2017 committee for one additional year, with this year’s conference to be hosted in Melbourne, Australia.

Hiring Additional CSEd Faculty – This year we were very fortunate to have the opportunity to expand the capacity of our team by hiring additional tenure-track lines with an emphasis on Computing Education Research. I had the pleasure of chairing one such search in the Computer Science department which resulted in the hiring of Briana Morrison (PhD from Georgia Tech) who is an expert in Cognitive Load Theory as applied to introductory programming exercises and comes to UNO with over 20 years experience as both a faculty member and an industry software developer at IBM. I was also pleased that another one of our finalists, Michelle Friend of Stanford University, was offered a position in the College of Education and was hired for that position. Michelle comes to UNO with experience as a middle school classroom teacher, a researcher of gender equity and child identity development in early computing experiences, and as former national president of the Computer Science Teachers’ Association.

Ongoing/Continuing Projects from Previous Years

The projects below are a sample of my ongoing efforts that have been discussed in previous annual reports, but details have been omitted here in interest of space.

- Metro Omaha Computer Science Teachers’ Association
- CS Education Week
- Code Crush

- Omaha Tech Talent Initiative
- TrACE Cyberlearning Environment (PI on NSF grant)
- WebJumper Learning Environment (Co-PI on NSF grant)

Recent Publications and Other Dissemination

- S. Dazo, N. Stepanek, R. Fulkerson, and B. Dorn. An Empirical Analysis of Video Viewing Behaviors in Flipped CS1 Courses. To appear in *Proceedings of the 21th ACM SIGCSE Conference on Innovation and Technology in Computer Science Education*, July 2016
- M. Jadud and B. Dorn. Aggregate Compilation Behavior: Findings and Implications from 27,698 Users. In *ICER'15: Proceedings of the 11th International Computing Education Research Conference*, pages 131-139, 2015.
- H. Muibi, B. Dorn, and T. Park. Teacher Perspectives on Web Design Instruction. In *ITiCSE'15: Proceedings of the 20th ACM SIGCSE Conference on Innovation and Technology in Computer Science Education*, pages 231-236, 2015.
- B. Dorn, D. Babb, D. M. Nizzi and C. M. Epler Computing on the Silicon Prairie: The State of CS in Nebraska Public Schools. In *SIGCSE'15: Proceedings of the 46th SIGCSE Technical Symposium on Computer Science Education*, pages 296-301, 2015.
- Neal Grandgenett, Nancy Edick, Dave Boocker, Hesham Ali, Angie Hodge, Brian Dorn, and Christine Cutucache. Community Chairs as a Catalyst for Campus Collaborations in STEM. *Metropolitan Universities Journal*, 26(1): 52-72, 2015
- L.B. Schroeder and B. Dorn. Enabling and Integrating Online Formative Assessment in a Flipped Calculus Course. To appear in: *Problems, Resources, and Issues in Mathematics Undergraduate Studies*. Status: in press
- B. Dorn – Invited attendee and presenter at the first-ever Dagstuhl (<http://dagstuhl.de>) seminar on Computing Education Research held in Germany during Feb 2016. Dagstuhl is the world's premier venue for computer science researchers to gather to exchange ideas and identify significant research opportunities, and selection of seminar topics and attendees is highly selective.

Immediate Future Opportunities

Reaching Rural Communities – While significant investments have been made to address underserved student populations in Omaha (and nationwide), most of these efforts frame underserved communities as those in inner city, ethnically diverse, low SES neighborhoods. However, this is an equally important group of students and teachers in under-resourced small rural schools that suffer from similar challenges in addition to being geographically isolated. I am currently in the process of starting new efforts to reach students and teachers in these important communities in ways that are culturally resonant, but distinctly different from work targeting inner-city communities.

Supporting Teachers in Graduate Work – Supporting in-service teachers seeking their graduate endorsement in Information Technology carries with it a need to address the financial element of taking courses. While we have been fortunate to secure funding for OPS teachers from Sherwood, we continue to explore creative ways to support teachers from other districts.