

## INTRODUCING...

the National Center for Research on Rural Education (R<sup>2</sup>Ed)



**A**nounced July 1, 2009, this nearly \$10,000,000, 5-year grant from the U.S. Department of Education, Institute of Education Sciences (IES), under the direction of Drs. Susan M. Sheridan (PI and Center Director), Todd Glover, Gwen Nugent, Gina Kunz and Jim Bovaird, will conduct cutting-edge rural education research. Ultimately, it aims to improve rural student learning in reading, science and math. It will do so by identifying how to best provide ongoing

professional development for teachers to deliver effective instructional strategies that produce the greatest outcomes for rural students.

Research on rural education is limited, and the Center will provide the infrastructure, leadership and expertise to focus on unique rural needs. Students will be the ultimate beneficiaries of the work to be conducted through this Center. We will reach them by enhancing the experiences of teachers (i.e., equipping them with new tools and research-based instructional techniques), who will transfer that new knowledge and skill set into their classrooms, thereby augmenting the classroom experiences of students.

The payoffs could be far reaching. Nationally, nearly 10 million youth attend school in rural areas. Researchers will study a fundamental question: What is the best way to provide professional development opportunities to teachers in rural areas? Research-based answers could guide improvements in professional development programs for rural teachers across Nebraska and throughout the nation.

*Pictured above, left to right: Drs. Gwen Nugent, Todd Glover, Susan Sheridan, James Bovaird & Gina Kunz*

## DIRECTOR'S NOTE

**When you are finished changing, you are finished.** – Benjamin Franklin

*This issue of CYFS Reflections depicts one static reality – the Nebraska Center for Research on Children, Youth, Families and Schools is not static! Change – and more importantly growth – characterizes our work on a daily basis as we strive to uncover new and effective ways to support children, families and the systems that envelop them. We are adding staff, welcoming folks like Seth Teager and Brian Muhlbach. We are embarking on the initiation of a parallel Center – the National Center for Research on Rural Education. We are adding to the depth of funded research studies in all of our thematic areas of strength. But the more things change, the more they stay the same. We continue to take very seriously our mission of supporting, through high quality research, healthy development and effective systems. We are still committed to creating new knowledge and strategies through the careful and systematic research of our affiliates. As before, we take pride in the meaningful, day to day positive effects produced by our evidence-based work. Most importantly, we are thankful for the opportunity to work with researchers, students, schools and communities who believe in the power of change and the growth it produces.*

Susan M. Sheridan, PhD  
Willia Cather Professor and Professor of Educational Psychology  
Director, Nebraska Center for Research on Children, Youth, Families and Schools  
Director, National Center for Research on Rural Education (R<sup>2</sup>Ed)

# THE CUTTING EDGE

## Workforce Skills for the 21st Century

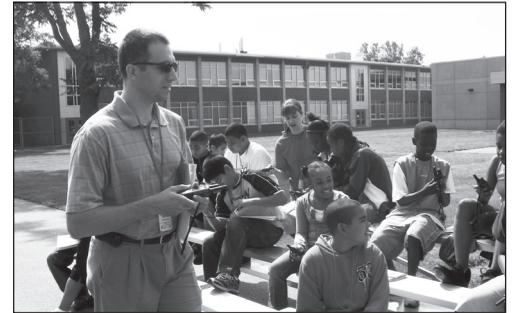
**R**obotics and GPS/GIS in 4-H: Workforce Skills for the 21st Century is a 5-year NSF scale-up project which utilized 4-H clubs to prepare middle school youth for the STEM workplace. "Our expectation is that more youth will chose STEM courses during their high school and college education and will be prepared for a career in these fields," noted Brad Barker, PI.

The project builds on and extends an existing research-based study by developing and testing new national curricula to introduce basic technology skills, foster problem solving and inquiry skills, and encourage teamwork. A professional development model to support youth learning of concepts focused on information and communications technology is designed and delivered to adult volunteers, after-school educators and parents.

The participation of girls and underrepresented populations is broadened through opportunities for collaboration and social networking and infusing cultural awareness within the project deliverables. The impact of these activities on youth STEM literacy, attitudes and workplace skills is documented. Research aims to better

understand how hands-on, inquiry-based robotics and GPS/GIS activities presented in an informal learning environment can effectively interest youth in and prepare them for the STEM workforce. Research questions include how educational robotics interventions impact youth STEM literacy, workforce skills and attitudes about STEM content. The research also investigates the use of the 4-H robotics curriculum to positively impact instructional practice of informal educators, their STEM content knowledge and their confidence.

The project draws upon an interdisciplinary team representing instructional technology, biological systems engineering, educational psychology, mathematics education, electronics engineering and evaluation. The team of Drs. Brad Barker, Slava Adamchuk, Gwen Nugent, Neal Grandgenett, and Bing Chin have integrated information, tools, perspectives, concepts and theories from their own disciplines and crafted a new perspective represented by the interaction of these multiple disciplines. Their collaborative work has allowed for the emergence of new approaches and solutions for preparing a highly trained STEM workforce.



Youth at the King Science and Technology Magnet Middle School in Omaha, NE working on geospatial activities (above). Youth testing their robotics programs at 4-H Robotics and GPS/GIS summer camp at Barr Middle School in Grand Island, NE (below).



## Research Digest

### Increasing Student Learning with Robotics

Barker, B. S., Nugent, G., Hampton, A. & Grandgenett, N. (2008). Examining 4-H robotics in the learning of science, engineering, and technology topics and the related student attitudes. *Journal of Youth Development*, 2 (3). Available from [www.nae4ha.org/directory/jyd/index.html](http://www.nae4ha.org/directory/jyd/index.html)

Preliminary research has shown promise in supporting the use of robotics to increase student learning outcomes in science and mathematics. However, much of the research on robotics as a teaching tool has had methodological flaws that make it difficult to state conclusively whether student learning and attitudes toward science are positively affected. This study examined the potential value of using robotics to teach science, technology, engineering and mathematics (STEM)

concepts in 4-H after-school and club programs. Specifically, the authors examined whether the use of robotics would increase students' understanding of learned concepts and attitudes toward science.

The robotics intervention, representing 15-20 contact hours, was designed around a LEGO Mindstorms kit, which includes 828 parts and a programmable microcomputer. The experimental group was comprised of 121 students from nine schools similar in size along with 4-H clubs or after-school programs. The control group was 36 students from three schools comparable to those in the experimental group. Two questionnaires (one on learned concepts and one on student attitudes) were administered to the students prior to the start of the intervention and 8 weeks later, after the intervention was complete. Results indicated

that the robotics intervention supported learning for STEM concepts. Neither age nor gender impacted the learning that occurred with the use of the robotics kit. Results also indicated that the robotics intervention did not affect intellectual or emotional attitudes toward science.

Using educational robotics to support teaching of math, science, and engineering concepts may be a way to engage students in learning and enhance their comprehension of these often difficult concepts. Development of other measures to more adequately reflect student attitudes toward both robotics and science may be needed to assess and detect attitudinal changes. Educational robotics demonstrates potential for use in improving student learning and should be an area of continuing research.

# CYFS CELEBRATIONS

## Congratulations to the following:

**Jody Koenig Kellas**, Department of Communication Studies, on her promotion to Associate Professor and tenure status. Dr. Kellas was also the winner of a Distinguished College Teaching Award from the College of Arts & Sciences.

**Carolyn Pope Edwards**, Professor of Psychology and Child, Youth, and Family Studies, won the 2009 Award for Distinguished Service to Children from the Nebraska Association for the Education of Young Children.

**Reece Peterson**, UNL Professor of Special Education and Communication Disorders, was invited by Chairman George Miller of the Education and Labor Committee of the United States Congress to testify at a Full Committee Hearing on "Examining the Abusive and Deadly Use of Seclusion and Restraint in Schools." In connection with the hearing he was also interviewed on National Public Radio.

## Congratulations also to Faculty Affiliates who have had books published this year, including:

Gimple, G. A., Ervin, R., Daly, E. J., III, & Merrell, K. W. (Eds.). (2010). *The practical handbook of school psychology: Effective practices for the 21st century*. New York: Guilford Publications.

**Helen Raikes and Carolyn Pope Edwards (2009)**. *Extending the dance in infant and toddler caregiving: Enhancing attachment and relationship*. Baltimore. Paul H. Brookes.

**Shell, D. F., Brooks, D. W., Trainin, G., Wilson, K. M., Kauffman, D. F., & Herr, L. M. (2009)**. *The unified learning model: How motivational, cognitive, and neurobiological sciences inform best teaching practices*. Dordrecht: Springer.

**Swearer, S. M., Espelage, D. L., & Napolitano, S. A. (2009)**. *Bullying prevention and intervention: Realistic strategies for schools*. New York: Guilford Press.

Jimerson, S. R., Swearer, S. M., & Espelage, D. L. (Eds.). (in press). *Handbook of bullying in schools: An international perspective*. New York: Routledge.

**Les Whitbeck (2009)**. *Mental health and emerging adulthood among homeless young people*. New York: Psychology Books.

Since January 2008, 23 grants have been submitted through CYFS involving 32 participants from 7 different areas within 4 colleges. The total dollar amount of grants submitted was over \$18 million. Congratulations to the Principal Investigators and Co-PIs of the following awards, with special hats off to the four Student Affiliates who received awards:

**Christopher Campbell** (student affiliate) and **Dr. David Hansen**, *Teacher-Child Interaction Training*, U.S. Department of Health and Human Services, ACF.

**Keely Cline** (student affiliate) and **Dr. Carolyn Pope Edwards**, *Instruction and Emotional Quality of Parent-Child Book Reading and Early Head Start Children's Learning Outcomes*, U.S. Department of Health and Human Services, ACF.

**Dr. Carolyn Pope Edwards**, *Early Childhood Course Conversion*, Buffett Early Childhood Fund.

**Dr. Lisa Knoche**, *Early Childhood Training Center*, Nebraska Department of Education.

**Sara Kupzyk** (student affiliate) and **Dr. Edward Daly**, *Preparing Teachers to Train Parents in the Use of Evidence-based Tutoring Strategies*, Wing Institute.

**Drs. Merilee McCurdy, Edward Daly, Gina Kunz, and Tanya Ihlo**, *Training School Psychologists in Response-to-Intervention Implementation and Systems Change*, U.S. Department of Education.

**Drs. Helen Raikes and Julia Torquati**, *Testing Thresholds of Quality on Child Outcomes Globally and in Subgroups: Secondary Analysis of QUINCE Early Head Start and Midwest Child Care Research Consortium Quality Rating Systems Pilot Data*, U.S. Department of Health and Human Services, ACF.

**Drs. Laurence Rilet, Gina Kunz, and Gwen Nugent**, *Distance Delivery of UNL's Comprehensive and High Quality Professional Development Math and Science Summer Technology Institute*, Coordinating Commission for Postsecondary Education.

**Drs. Michael Scheel and Gina Kunz**, *Building Bridges Through Relationships: A High School Dropout Prevention Program*, Woods Charitable Fund.

**Carrie Blevins Semke** (student affiliate) and **Dr. Susan Sheridan**, *The Efficacy of Conjoint Behavioral Consultation as a Collaborative Approach to the Treatment of Childhood Obesity*, Society for Research in Childhood Development.

**Drs. Susan Sheridan, Todd Glover, Gwen Nugent, Gina Kunz, and James Bovaird**, *National Center for Research on Rural Education*, U.S. Department of Education, IES.

**Drs. Susan Sheridan and Lisa Knoche**, *Development of a Three-Tiered Model in Early Intervention to Address Language and Literacy Needs of Children at Risk*, U.S. Department of Education, IES.

**Drs. Susan Sheridan, Gwen Nugent, Gina Kunz, and James Bovaird**, *Continuity Across Family and School Systems to Promote the Learning and Development of Children and Adolescents*, National Science Foundation.

## Research Spotlight

### Bradley Barker, PhD



Dr. Bradley Barker, Assistant Professor and Youth Development Specialist with Nebraska 4-H and CYFS Faculty Affiliate, is committed to delivering STEM education to youth in fun and exciting ways. "In our program, youth have reported increases in knowledge of specific STEM areas, improved attitudes towards STEM, and increased interest in pursuing STEM careers." Barker received his PhD in

Administration, Curriculum and Instruction in the area of Instructional Technology in 2002. Dr. Barker spent 8 years with Nebraska Educational Telecommunications (NET) where he was an Interactive Media Producer. He also has directed media productions for the Nebraska Law Enforcement Training Center and the Nebraska National Guard.

Currently, Dr. Barker is the Principal Investigator on two National Science Foundation grants to *develop* the Nebraska 4-H Robotics and GPS/GIS program and to *scale-up* the program to a national audience. Barker is also the Principal Investigator on a curriculum development grant for National 4-H Council and CSREES, "The National 4-H Robotics: Engineering for Today and Tomorrow."



CYFS is pleased to welcome Seth Teager (left) as the Center's web and graphics designer and Brian Muhlbach (lower right) the Center's print media specialist. Teager holds a degree in Visual Communications and Design and has 5 years of experience as a graphic artist.

Muhlbach is a student in Advertising and Journalism. They will contribute their skills and expertise in a variety of ways, including the design and development of informational and promotional websites, print material, identity design and video production.



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# MAKING A DIFFERENCE...

## ...for Children in Head Start

Chris Campbell, CYFS Student Affiliate and doctoral student in Developmental Psychology at UNL, received a dissertation grant from the U.S. Department of Health and Human Services Administration for Children &



Families entitled "Adapting an Evidence-Based Intervention

to Improve Social and Behavioral Competence in Head Start Children: Evaluating the Effectiveness of Teacher-Child Interaction Training." The primary objective of this 2-year, nearly \$50,000 grant is to evaluate the efficacy of Teacher-Child Interaction Training (TCIT), cost-effective, and short-term teacher intervention designed to promote social and behavioral competence in Head Start children and increase teacher efficacy and satisfaction.

Six Head Start teachers and approximately 90 children and their parents at three Head Start Centers will participate. This research will provide important

information to Head Start researchers, practitioners, and policy makers on the efficacy of a widely applicable and easily disseminated teacher training program to reduce a broad spectrum of social and behavioral problems that could negatively impact preschoolers' acquisition of important skills relevant to future school readiness and adjustment.

"There is no way the grant would have been a success without the help of so many individuals at CYFS. A huge part of the success of this grant was Dr. Todd Glover's continuous efforts. I will forever praise Todd and the rest of the Center!" said Chris Campbell.

## CYFS CALENDAR



### Holiday Art Supply Drive

*We are collecting new children's art supplies for those less fortunate in the Lincoln area. Please bring your unwrapped art supplies to the Center by*

**December 14, 2009.**

*Please join us in providing a small token of our commitment and dedication to children and families.*

### CYFS Statistics & Research Methodology (SRM) Series:

Friday, **December 11, 2009**, 12-1pm  
242 Mabel Lee Hall: Kevin Kupzyk, MA:  
"Introduction to Multilevel Modeling"

**April 19-20, 2010:** Dr. David Cordray will present on implementation fidelity in randomized trials