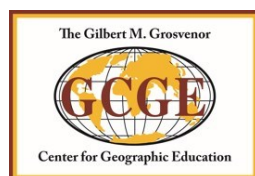

GeoProgressions Symposium

February 6-8, 2014
National Geographic Society
1145 17th Street NW
Room M2006
Washington, D.C.






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Summary of Ning Community Discussions

Project participants: The GeoProgressions project involves seventeen committed members from diverse academic backgrounds, spanning geography, mathematics, and science education research. The project's senior personnel hail from the U.S. and U.K, as mapped below.



Learning progressions research interests: The geography education researchers involved in the project are interested in advancing the quality of geography teaching and learning, based on *Geography for Life: National Geography Standards (2nd edition)*. The community is interested in learning progressions as a research approach that may provide evidence-based explanations of how students learn key geography concepts. Challenges in securing funding and the inclusion of results and recommendations in schools were expressed by some of the participating geographers.

The participating math and science education experts bring valuable perspectives from their research experience (e.g., development and empirical testing of learning progressions, validation of assessment instruments, creation of curriculum and professional development based on learning progressions research). Their work has potential to guide efforts of researchers in geography education, drawing on examples of learning progressions in math and science (e.g., matter and measurement units). From their work it is clear that the process of empirically testing learning progressions is both challenging and time intensive.

Resources downloadable from Ning:

CPRE Report on learning progressions: A report that provides an overview of learning progressions merits and limitations as well as examples of current work in the field.

Spatial Thinking Report (focus on K-5 grades): The literature review summarizes the findings of cognitive science and geography researchers that are closely related to mapping tasks.

Geography standards (Georgia and Texas): Stand-alone geography standards for Georgia and Texas illustrate key language and concepts considered important for geography, including a section on mapping.



GeoProgressions Reception and Dinner

Thursday, February 6th

Location: 15 RIA Restaurant
1515 Rhode Island Avenue NW
Washington DC
Tel: 202-251-7101



6:00 pm

Reception

The symposium will begin with a reception and dinner at which time delegates can meet and become acquainted in a relaxing and informal setting. Michael Solem will provide welcoming remarks and a brief overview of the agenda for the following two days.

7:00 pm

Dinner

Toward Learning Progressions in Geography Education

Friday, February 7th

9:00 am

Introducing the GeoProgressions Project (Michael Solem and Richard Boehm)

The morning's sessions will begin with an overview of the two-year GeoProgressions project and the initial work to be performed by the delegates during and after the symposium.

Symposium objective: To reach consensus on a research design and methodology for developing and testing a set of hypothetical learning progressions based on Geography for Life: National Geography Standard 1.

9:30 am

Geography for Life: National Geography Standard 1 (Sarah Bednarz and Audrey Mohan)

The symposium will continue with a presentation of the national geography standards and a summary of research and educational resources that is relevant for developing learning progressions based on Standard 1: How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information.

10:00 am

AAG review of Learning Progressions Research (Niem Tu Huynh)

At the recommendation of the Road Map Project, the AAG conducted a literature review of learning progressions research to assess the potential value of this approach for improving the quality of geography teaching and learning. This presentation will summarize the findings of the review with regards to:

- ◇ *Research methodologies from math and science education*
- ◇ *Debates over the merits and limitations of learning progressions research*
- ◇ *A draft geography learning progression*

Toward Learning Progressions in Geography Education

Friday, February 7th (continued)

10:30 am

Snack Break

10:45 am

Research Roundtable

Participating delegates will each prepare a 5-minute presentation (2-3 slides maximum) to describe what they view as being a key opportunity and a key challenge that warrants attention as we move forward. Presentation order: Hui Jin, Shawn Stevens, Amelia Wenk Gotwals, Jeffrey Barrett, Audrey Mohan, and Richard Boehm.

Questions to consider include:

- ◇ *What might the future of learning progressions in geography look like?*
- ◇ *What adaptations or changes could be made to current research models?*
- ◇ *What is the potential value of learning progressions for geography education?*

Time will be reserved for questions and discussion.

12:00 pm

Lunch

1:00 pm

Research Planning and Design (small group breakouts)

Participants will work in two interdisciplinary working groups to prepare an outline of a research project aimed at developing and testing hypothetical learning progressions for Geography for Life: National Geography Standard 1. Each group should consider the following issues in their deliberations:

- ◇ *format of the learning progression(s)*
- ◇ *IRB permission for data collection at schools*
- ◇ *sample sizes and locations*
- ◇ *methods of data collection*
- ◇ *instrument development procedures*
- ◇ *methods for content and empirical validity*
- ◇ *data analysis techniques*
- ◇ *results reporting format*
- ◇ *communication of learning progression(s) to broader audience in STEM education*

Each working group should assign a note taker and prepare a brief slideshow with their research outline.



Toward Learning Progressions in Geography Education

Friday, February 7th (continued)

2:30 pm

Snack Break

4:00 pm

Presentations of Research Outlines

Each working group will be given 30 minutes to present their outlines and explain their research proposals. The presentations should last no more than 20 minutes so that there will be at least 10 minutes for questions and feedback.

5:00 pm

Adjourn for the day

Delegates will be free in the evening to organize dinner and reflect on the day's discussions on their own or in groups.

Building Consensus on a Research Methodology

Saturday, February 8th

9:00 am

Research Synthesis

The second day of the symposium will begin with a debriefing and review of the preceding day's discussions, offering delegates a chance to seek clarifications or ask additional questions of each other.

Participants will once again be organized into two working groups, but this time the composition will be mixed so that different members have a chance to "cross-pollinate" and share ideas. Each group will be tasked to prepare a revised research outline that synthesizes the two proposed approaches presented on the previous day and any new idea development.

10:30 am

Snack Break

11:00 am

Group presentations

Each working group will be given 30 minutes to present their revised research outlines and explain how they attempt to reconcile differences in the proposed approaches. The presentations should last no more than 20 minutes so that there will be at least 10 minutes for questions and feedback.

12:00 pm

Lunch and Reaching Group Consensus

Over a working lunch, the full group of delegates will compare the revised research plans side-by-side and work together to formalize a research plan and methodology.

Building Consensus on a Research Methodology

Saturday, February 8th (continued)

1:00 pm

Planning the Researcher-Training Handbook and Workshop

The final activity of the symposium will be drafting the table of contents for the researcher-training handbook, using the consensus research outline as a starting point. The delegates will also begin to discuss the format, objectives and timing of the researcher-training workshop that will match graduate students with learning progressions experts as mentors. Topics to be discussed in this activity will include:

- ◇ *Discuss format of handbook (e.g., written, interactive, video etc.) and agree upon writing assignments for different chapters;*
- ◇ *Clarify participant interest, expectations as a mentor, and best practice model(s) to follow;*
- ◇ *Discuss mentoring format, commitments, and contribution as a mentor;*
- ◇ *Logistics (e.g., how to match mentor and mentee; strategic plan to widen the call for graduate students and early career scholars);*

2:30 pm

Wrap-Up

Before departure, delegates will be asked to complete forms for travel reimbursement, stipends, and the workshop evaluation.

3:00 pm

Conclusion of Symposium

GeoProgressions Symposium

Project Leader Biographies



Michael Solem
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Michael Solem is Educational Affairs Director for the Association of American Geographers. Michael is principal investigator on several large-scale, federally funded projects spanning geography at all levels of education, focusing on professional development, internationalization, global education, and teacher preparation. His publications include articles in the *Annals of the Association of American Geographers*, *The Professional Geographer*, *Research in Higher Education*, *Education About Asia*, *The Geography Teacher*, the *Journal of Geography in Higher Education*, and the edited books *Aspiring Academics*, *Teaching College Geography*, and *Practicing Geography*. Michael currently serves as co-Director of the National Center for Research in Geography Education and is Treasurer for the International Geographical Union's Commission on Geographical Education. He is a member of the editorial board for the *Journal of Geography in Higher Education*, *Review of International Geographical Education Online*, and the *Journal of Research and Didactics in Geography*. Michael has twice received the *Journal of Geography in Higher Education's* award for promoting excellence in teaching and learning for his research on faculty development and graduate education in geography.



Niem Tu Huynh
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Niem Huynh is a Senior Researcher at the Association of American Geographers (AAG). She has worked closely with inner city high school teachers in D.C. and parts of Maryland, as part of the My Community Our Earth - Global Connections and Exchange program, to introduce mapping and geospatial technologies as tools for data analysis and communication in science. This experience dovetails with her research interest of geography education, specifically using geospatial tools. Niem serves as an internal evaluator for several education projects and is currently organizing an interdisciplinary workshop on learning progressions. She was the research coordinator and co-editor of *Road map for 21st century geography education: Geography education research*, a report to improve research in geography education.

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Project Leader Biographies



Richard Boehm
Texas State University
*Professor and Jesse H.
Jones Distinguished Chair
in Geographic Education*
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Richard G. Boehm presently holds the Jesse H. Jones Distinguished Chair in Geographic Education at Texas State University. He is also the Director of the Gilbert M. Grosvenor Center for Geographic Education and Co-Director of the newly formed National Center for Research in Geography Education. He has received numerous awards for his work including "Distinguished Geography Educator" by the National Geographic Society, the George J Miller Award for Distinguished Service by the National Council for Geographic Education (NCGE) and Grosvenor Honors in Geographic Education by the Association of American Geographers. Dr. Boehm is the Executive Editor for the scholarly journal *Research in Geographic Education*, and has authored several best-selling geography and social studies books for grades K-12. He was a co-author of *Guidelines for Geographic Education* (1984) and *Geography for Life: National Standards in Geography* (1994). Recently he has worked closely with Carmen Brysch, Grosvenor Scholar at the National Geographic Society, to develop the Learning Cluster Method, a hybrid online professional development system for teachers. He has also worked recently with Dr. Michael Solem on three NSF applications; (1) Geospatial Technology in STEM Teacher Training, (2) Assessment in Introductory Geography Courses, and (3) Developing Materials to Improve Workforce Success for Geography/Geoscience Students.



Carmen Brysch
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Carmen Brysch is a PhD candidate in geography education at Texas State University. She is currently serving as the Grosvenor Scholar at National Geographic Society (NGS) working with the Foundation and Education Programs. Prior to coming to NGS, Carmen served as the Senior Research Assistant in the Grosvenor Center for Geographic Education at Texas State and remains involved in many of the Grosvenor Center's major projects and initiatives. Her dissertation research focuses on the efficacy of the online professional development system, *Geography: Teaching with the Stars* (www.geoteach.org). As an outgrowth of this research, she is currently, with Dr. Richard G. Boehm, developing the Learning Cluster Method, a hybrid dissemination approach for *Stars* which expands the concepts of developing and enhancing teacher leadership skills while also building professional learning communities through the use of online forums. Carmen has won a number of significant awards including the E. Willard and Ruby S. Miller Grant Award for Research in Geographic Education and the Association of American Geographer's Geography Education Student Paper Competition. She has published in the *Journal of Geography*, the *Papers of the Applied Geography Conferences*, and the Chinese journal, *Global Education*.

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Participant Biographies



Gillian Acheson
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Gillian Acheson is Associate Professor and Chair of the Department of Geography at Southern Illinois University Edwardsville. She earned her doctoral degree from Texas A&M University in 2003 and came to SIUE in the fall of 2004. She is a broadly trained human geographer with interests in geographic education and cultural landscapes. In particular, she is interested in how people understand maps, how local landscapes are created by the people who live in them, and by the geography of food. She has published articles in *Research in Geographic Education*, the *Bulletin of the Illinois Geographic Society*, and *Social Education* and received grants to study the changing cultural landscape of small towns and study high school students' map skills. In addition, she has consulted on test items for the geography strand of the Texas Essential Knowledge & Skills (TEKS) and the National Assessment of Educational Progress (NAEP) tests.



Jeff Barrett
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Professor of Mathematics
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Jeffrey E. Barrett is *Professor of Mathematics Education* and also serves as an *Associate Director* of the Center for Mathematics, Science and Technology at Illinois State University. His research interests include the learning and teaching of the mathematics of measurement, geometric reasoning, the use of computer software to model mathematical ideas, and the professional development of teachers engaged in teaching elementary and middle-school level mathematics. Dr. Barrett is currently Principal Investigator of a four-year project, *Learning Trajectories to Support the Growth of Measurement Knowledge: Pre-K through Middle School* in collaboration with Douglas Clements and Julie Sarama at the University of Denver and Craig Cullen, a colleague at Illinois State University. This work extends the project, *Children's Measurement*, an examination of learning trajectories on children's development of spatial measurement knowledge from prekindergarten through Grade 5 (with NSF funding from 2007 and 2011). Barrett recently served as the Principal Investigator for an Illinois Math Science Partnership project funded by the Illinois State Board of Education (2010 through 2013) to support professional development of elementary teachers in using measurement learning trajectories as a basis for formative assessment: *Formative Assessment Improving Teachers' Instructional Practices*.

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Participant Biographies



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Margaret Crocco
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Sarah Witham Bednarz is a professor of geography at Texas A&M University and associate dean for academic affairs in the College of Geosciences. She served on the committee that produced the report from the National Research Council *Learning to Think Spatially* (2006) and co-chaired the Geography Education Research Committee of the Roadmap for 21st Century Geography Education Project in 2011-2013.

Margaret Crocco is Visiting Scholar in the Department of Teacher Education at Michigan State University (MSU). Before that, she served as Professor and Dean of the College of Education at the University of Iowa and Special Assistant to the Provost for STEM and online education. For almost twenty years, she was on the faculty of Teachers College, Columbia University. During this time she coordinated the Program in Social Studies and was elected chair of the Department of Arts and Humanities. Her scholarly focus has been on women's history, the history of education, and teaching social issues, including, most recently, sustainability. She has also done significant curriculum development work tied to documentary films, including, most prominently, *Teaching The Levees*, keyed to Spike Lee's *When the Levees Broke* about Hurricane Katrina and *Pray the Devil Back to Hell* about the civil war in Liberia, among others.

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Participant Biographies



Amelia Wenk Gotwals
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Amelia Wenk Gotwals has a BA in Biology from Brown University and an MS in Ecology and Evolutionary Biology, MS in Educational Studies, and a Ph.D. in Science Education from the University of Michigan. She is currently an assistant professor in the Department of Teacher Education at Michigan State University. Her research interests are focused around the learning progressions that K-12 students take when learning science, the trajectories that teachers follow when developing expertise in teaching, and the interaction of these two in the classroom. In particular, she is interested in: (1) the development and evaluation of learning progressions for how students learn to utilize science practices (specifically, formulating evidence-based explanations and arguments) to reason about disciplinary core ideas (especially in ecology); (2) the design and validation of assessments to gather evidence of students' developing understandings; and (3) the characterization of how teachers develop more sophisticated formative-assessment teaching practices.



Hui Jin
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Hui Jin is an assistant professor at The Ohio State University. She received her PhD in Curriculum, Teaching, and Educational Policy from Michigan State University in 2010. Her dissertation research focused on the development of a learning progression for energy and causal reasoning in socio-ecological systems. During her career, Jin has pursued interests in learning progressions, conceptual change, climate change education, and secondary science teaching. Her current research involves the development of an instruction-assisted learning progression for argumentation, investigation of teachers' understanding and use of learning progressions, and video analysis of classroom teaching. She is also part of a research team that develops learning progressions for matter and energy in social-ecological systems.

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Participant Biographies



Audrey Mohan
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Audrey Mohan joined BSCS as a Research Associate in December 2012. Her expertise is in the design of instructional materials and professional development for K-12 teachers, and she also conducts research and evaluation studies related to teacher and student learning in science. Prior to joining BSCS, Audrey worked in a number of roles (high school teacher, professor, researcher director, university staff) in geography, social studies, and STEM education. She is particularly interested in the design of professional development and curriculum materials in geography and environmental studies. She is also interested in studying how domestic and international travel experiences influence the knowledge, teaching practice, and worldview of geography and environmental science teachers. Audrey has a B.A. in History from the University of Notre Dame, an M.Ed. with emphasis on special education from University of Texas-Austin, and a Ph.D. in Geography with emphasis in geography education from Texas State University-San Marcos. She lives in Colorado Springs and spends her free time hiking, camping, or skiing with her husband and two year old son.



Eui-kyung Shin
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Eui-kyung Shin is Associate Professor in the Department of Literacy Education at Northern Illinois University where she teaches undergraduate and graduate courses in social studies education. Her research and teaching efforts have been devoted to students' learning of geographic thinking in social studies, especially the integration of GIS technology into K-12 classrooms. Since 2002, she has made numerous presentations at the NCGE meetings and published articles in journals such as *Journal of Geography*, *The Geography Teacher*, *Theory and Research in Social Education*, and *Social Studies and the Young Learner*. Her doctoral dissertation received the first place NCGE dissertation award in 2004. She has served on various committees and task forces such as research committee, dissertation award task force and K-5 spatial thinking task force in the NCGE. She is currently serving on an editorial board for the *Journal of Geography*.

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Participant Biographies



Shawn Stevens
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Shawn Stevens is an assistant research scientist in the School of Education at the University of Michigan where her work focuses on assessing and improving learning in formal and informal environments. Her current research efforts include developing and empirically testing learning progressions for a variety of disciplines and developing interdisciplinary high school curriculum materials to help students understand electromagnetic interactions and their role in the structure, function and behavior of matter. She co-authored a book to support secondary teachers' incorporation of nanotechnology into the classroom. She was a member of the design team for that defined drafted learning progressions for the core ideas of physical science for grade K-12 learners for the *Framework for K-12 Science Education*. She received her AB in chemistry from the University of Chicago and her PhD in chemistry from the University of Michigan.



Jill Wertheim
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Jill Wertheim has diverse experience in scientific research, assessment framework development, and assessment research and development. Her experience includes working at AAAS Project 2061 as a Research Associate performing research on student misconceptions in earth science, as well as developing classroom assessment items and instructional materials, and evaluating items, instructional materials, and standards. At National Geographic she has been Research Director for an NSF report on assessment for K-12 geography, working with a national blue-ribbon committee to evaluate the state of the field, make recommendations about how to advance the field, and develop an assessment framework for 21st century geographical sciences knowledge and skills, and is currently Program Manager for Climate Education, primarily focused on an NSF Climate Change Education Partnership. She also has served as an evaluation advisor for projects at National Geographic and at NOAA, and as an expert reviewer for science content and instructional design projects at National Geographic, and an expert reviewer for the Next Generation Science Standards (NGSS) on behalf the National Science Teacher's Association (NSTA).



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Participants Not in Attendance

Susan Gallagher Heffron
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