

## ASKING GEOGRAPHIC QUESTIONS TO ADDRESS POLITICAL ISSUES

University of Colorado Colorado Springs, Department of Geography and Environmental Studies

### 1. Facilitate collaborative research among geographers and STEM education researchers.

- Please send us a list of individuals who are participating in your project: Name, Title, Affiliation, Location, Area of Research Expertise.

#### Key Individuals

Rebecca Theobald, Assistant Research Professor, University of Colorado Colorado Springs, Department of Geography and Environmental Studies, Colorado, geography education, community engagement, and political geography

Saskia van de Gevel, Associate Professor, Department of Geography and Planning, Appalachian State University, North Carolina, endangered mountain forest ecosystems, professional development for geography educators

Andy Mink, Civics Research Fellow, National Humanities Center, North Carolina, teacher training, scholarly outreach, digital innovation, and experiential learning

Anita Palmer, Online Geospatial Technology Education Specialist, National Geographic Fellow, GISec, Texas, interactive mapping instruction and classroom engagement, teacher training

#### Additional Participants

Name	Title	Affiliation	State	Research Expertise
Gale Ekiss	Coordinator	Arizona Geographic Alliance	AZ	geography education (retired)
Heather Moll	Program Coordinator	Arizona State University	AZ	pedagogical assessment
Thomas Herman	Director, CGA	San Diego State University	CA	social geographies, evolution of urban neighborhoods
David DiBiase	Director of Education	Esri, Inc.	CA	geospatial technology
Chris Elnicki	Executive Director	Colorado Center for Civic Learning and Engagement	CO	social studies education
Toni Larson	President	League of Women Voters	CO	community engagement
Richarc Schultz	Statewide Educator Outreach	Illinois Mathematics and Science Academy	IL	teaching with technology, GIS
Sheila Kennedy	Professor	Indiana Univ - Purdue Univ	IN	law
Alex Oberle	Associate Professor	University of Northern Iowa	IA	geography education
Rachel Hansen	Teacher	Geographic Alliance in Iowa	IA	professional development
Richard Leadbeater	State/Provincial Government Industry Solutions Manager	Esri	MD	state and local government
Celeste Reynolds	Teacher	Mashpee Middle-High School	MA	advanced placement human geography
Bruno Hicks	Dean	Fitchburg State University	MA	education
Debra Troxell	Teacher	West Forsyth High School	NC	advanced placement human geography
Jacquie Housel	Professor	Sinclair Community College	OH	human geography, GIS
Allison Young	Instructor	Sinclair Community College	OH	physical geography, environment
Jennifer Lumpkin	Graduate Assistant	University of Dayton	OH	planning, GIS, community organizing
Gary Gress	Instructor	University of Oklahoma	OK	teaching, curriculum design
Janet Smith	Professor	Shippensburg University	PA	applied geography, geography education
Nicole Eshelman	Teacher	Manheim Township High School	PA	geography
Maggie Hutchins-Wagner	Grant Specialist	Texas State University	TX	geography education
Edward Kinman	Associate Professor	Longwood University	VA	health
Ryan Weichelt	Associate Professor	Univ of Wisconsin-Eau Claire	WI	elections

### 2. Attract more diverse cohorts of graduate students to Ph.D. programs in Geography Education.

- Please send us a list of any undergraduate and graduate students who participated in your project, and include gender, race/ethnicity if known.

### Graduate Students

Dwayne Liller, University of Colorado Colorado Springs, veteran, male, white

Matthew Ruiz, University of Northern Iowa, male, white

### Undergraduate Student

Cassie Kearney, Middlebury College, female, white

### High School Student

Madison Eagen, Mashpee Middle-High School, female, white

### **3. Increase research productivity and the knowledge base in geography education.**

- Please send us a list of the following outcomes of your projects, including any pending material.

### Publications

*The Geography Teacher*, special issue devoted to the census, Volume 16, Issue 3, 2019 (forthcoming)

State mapping exercise instructions to create a web application at a finer scale than that of the county (forthcoming)

*The Ethics of Gerrymandering*, National Center for the Humanities webinar, 16 May 2019 (<https://nationalhumanitiescenter.org/education-programs/webinars/>)

*Directions Magazine*, Esri, 1 May 2019 (<https://www.directionsmag.com/article/8758>)

TEDxMashpeeED Talk, *Redistricting of the people, by the people, and for the people*, Mashpee, MA, 30 April 2019 (<https://sites.google.com/mpspk12.org/tedxmasheeed2019/home>)

National Conference on State Legislators, communication with legislative staff about GeoCivics resources, 18 March 2019

State mapping exercises using a web application for the 43 states with more than one congressional district (<https://www.uccs.edu/geocivics/stateresources>)

*Apportionment, Redistricting, and Gerrymandering*, PowerPoint presentation supporting GeoCivics project (<https://www.uccs.edu/geocivics/stateresources/background>)

### Conference presentations

*Using interactive maps to explore apportionment and redistricting*, National Council for the Social Studies / National Council for Geographic Education Conference, Austin TX, November 2019 (pending)

*Is this a good map for your car? When to use floor maps, paper maps, and online maps: exploring redistricting using multiple modes.* Colorado Learning and Teaching with Technology, University of Colorado, Boulder, August 2019 (pending)

*"This was chill": Using interactive maps in civics and government classes*, Esri Education Summit, San Diego CA, 7 July 2019

*Opportunities for Discussing Transparency and Fairness in Redistricting*, Annual Conference: The Geography of Redistricting, Center for Geographic Alliance, Harvard University, Cambridge MA, 3 May 2019

*Current and Future Directions of Geography's Role in Redistricting and Gerrymandering Studies*, American Association of Geographers Annual Meeting, session organized with Ryan Weichelt

(chair), five papers and over seventy individuals in attendance, <https://aag.secure-abstracts.com/AAG%20Annual%20Meeting%202019/sessions-gallery/22796>

*GeoCivics: Apportionment, Redistricting, and Gerrymandering*, American Association of Geographers Annual Meeting, Washington DC, 6 April 2019

*GeoCivics: Evolution and Next Steps*, American Association of Geographers Annual Meeting, Washington DC, 4 April 2019

*GeoCivics as an Entry Point for Global Citizenship*, Political Geography Specialty Group Preconference, Washington DC, 2 April 2019

*GeoCivics: Evolution and Next Steps*, Colorado GIS in Higher Education Summit, Front Range Community College, Longmont CO, 22 March 2019

*Exploring Redistricting in Colorado*, University of Colorado Colorado Springs Staff Enrichment Day, Colorado Springs CO, 20 March 2019

*Asking Geographic Questions to Address Political Issues*, Colorado Council for the Social Studies Conference, Denver CO, 15 March 2019

*GeoCivics: A Feet and Hands-on Approach to Redistricting and Apportionment*, GeoTech Annual Conference, Dallas TX, 3 March 2019

*GeoCivics: Apportionment and Redistricting Resources*, Texas Social Studies Supervisors Association Spring Conference, Austin TX, 15 February 2019

*Apportionment and Redistricting: Asking geographic questions to address political issues*, Powerful Geography: New Thinking for the Next Generation of Geography Education, San Juan, Costa Rica, 2 November 2018

*Apportionment and Redistricting: Asking geographic questions to address political issues*, American Association of Geographers Middle States Regional Division Annual Meeting, Montclair NJ, 26 October 2018

*GeoCivics: Apportionment and Redistricting*, Texas Council for the Social Studies Annual Conference, Houston TX, 15 October 2018

*Apportionment and Redistricting: Asking geographic questions to address political issues*, American Association of Geographers Southwest Regional Division Annual Meeting, Baton Rouge LA, 5 October 2018

*Explore Geography, Math, and GIS to Understand Apportionment and Redistricting*, Canadian Association of Geographers, National Council for Geographic Education, and International Geographical Union Conference, Québec City, Canada, August 2018

*Political Geography and Gerrymandering*, Geographic Alliance of Iowa and the Iowa Bar Association, Des Moines, IA, 18-19 July 2018

#### Proposals submitted, awarded, declined

University of Colorado Regents' Civics Initiative, "undergraduate initiatives, certificates, and minors", pending

American Honda Foundation under "youth education, specifically in the areas of science, technology, engineering, mathematics", declined

Mabel Y. Hughes Charitable Trust under "support for educational institutions and educational programs in the state of Colorado", declined

Intel Foundation under "Supporting a diverse community of innovators using technology to solve local problems", declined

Joyce Foundation, under “focus on equitable access to education and work to support an engaged democracy”, declined

Contributions to NCRGE research clearinghouse

GeoCivics (website: <https://www.uccs.edu/geocivics/>)

**4. Long-term growth and stability of the RCN.**

In addition to the organizations listed above under numbers 2, 3, and 4, the following organizations hosted GeoCivics presentations or discussed ideas for how to incorporate GeoCivics into their programs. Over 1500 people have been reached directly through the pilot phase of the project, with additional individuals finding the information through publications and social media. Geographers have an opportunity to build on connections, but it takes time and funding.

<b>Collaborator</b>	<b>Institution / Activity</b>	<b>Location</b>
Marv Sorensen	Benson High School	Benson, AZ
Heather Moll	Arizona Geographic Alliance	Tempe, AZ
Barbara Headle	Department of History, University of Colorado	Colorado Springs, CO
Steve Foster	Durango School District 9R	Durango, CO
John Hise	Escalante Middle School	Durango, CO
Kelly Langley Cook	University of Northern Colorado	Greeley, CO
Adrienne Tecza	Northfield High School	Denver, CO
Phil Klein	Fort Morgan Library and Museum	Fort Morgan, CO
Heidi Ragsdale	Geo-Inquiries Workshop	Steamboat Springs, CO
Cindy Stout	Teaching Geography using Primary Sources Workshop	Aspen, CO
Victoria Bull	Northglenn High School	Thornton, CO
Sara Osborne	Palmer High School	Colorado Springs, CO
Rebecca Theobald	Grace Episcopal Church	Colorado Springs, CO
Beth Hendrix	Colorado League of Women Voters	Denver, CO
John Wheeler	Iowa Bar Association	Des Moines, IA
Chris Taylor	Boise School District	Boise, ID
Jacob VandeMoortel	School District U-46	Elgin, IL
Joseph Wojtas	South Elgin High School	Elgin, IL
Rebecca	South Street Elementary School	Fitchburg, MA
Denise LaFrance	Fitchburg State University Department of Education	Fitchburg, MA
Skip Thibault	Northwood High School	Pittsboro, NC
Saskia Van de Gevel	North Carolina Geographic Alliance	Raleigh, NC
Melissa Thibault	North Carolina School of Science and Mathematics	Durham, NC
Keith and Pat Sharp	Raleigh School District	Raleigh, NC
Saskia Van de Gevel	Nat Geo State Geography Steward	Boone, NC
Benjamin Norsworthy	Stivers School for the Arts	Dayton, OH
Tricia Merenda	Worthington Public Schools	Worthington, OH
Mitch Miller	Oakwood High School	Dayton, OH
Linda McKean	Office of Learning and Instructional Strategies (Ohio)	Columbus, OH
Keith Gaddie	University of Oklahoma	Norman, OK
Rachel Holler	William Tennent High School	Warminster, PA
Nancy Peter	Philadelphia Education Fund	Philadelphia, PA

Anita Palmer	Texas Council for the Social Studies	Houston, TX
Anita Palmer	National Geographic Fellow Mapping	Washington DC
Doug Andersen	Oak Canyon Junior High School	Lindon, UT
Kathy Jefferson	Fuqua School / Virginia Geographic Alliance	Farmville, VA
Bob Kolvoord	James Madison University	Harrisonburg, VA

## **5. Promote the use of research to improve practice in geography education.**

The major challenge with geography education continues to be the uneven distribution of course availability and inconsistent instruction across the United States (Jones, M.C. and M. Luna, "Geography Deserts: State and Regional Variation in the Formal Opportunity to Learn Geography in the United States, 2008-2015", *The Geography Teacher*, 118:88-100, March-April 2019). By using civics education and government classes, which are much more widely available in secondary school, as an entry point for teaching geographic concepts such as push and pull factors in migration and implications of physical barriers to commerce, the possibility of reaching more educators emerges. In addition, the topic of redistricting is attracting broad groups of people in communities across the United States. By introducing geospatial technology tools to students and community members, they will have an opportunity to begin to figure out how to engage with the redistricting process by talking with their elected representatives from a position of knowledge. Geographic concepts and skills will need to be emphasized in civics standards as well as in social studies, science, and technology. As in the classroom, teacher training programs for history and political science students will need to engage with geospatial technology materials. Academic geographers are seeing the value of taking up the discussion about redistricting from both theoretical and practical perspectives.

**Project Participants**

Coline Dony	Senior Geography Researcher	American Association of Geographers	Washington, DC	Health Geography and GIScience
Sergio Rey	Professor	University of California, Riverside	Riverside, CA	GIScience
Laura Tateosian	Research Associate Professor	North Carolina State University	Raleigh, NC	Geovisualization and GIScience
Atsushi Nara	Assistant Professor	San Diego State University	San Diego, CA	Spatiotemporal data analytics and geocomputation
Eric Delmelle	Associate Professor	University of North Carolina at Charlotte	Charlotte, NC	Health Geography
Giuseppe Amatulli	Research Scientist	Yale University	New Haven, CT	Geocomputation
Diana Sinton	Executive Director	University Consortium for Geographic Information Science	Ithaca, NY	GIScience

**Conference Presentations**

- Dony C., Fekete E. (2018) Encoding Geography. In “Teaching Geography” Paper Session. Annual Meeting of the West Lakes Division of the American Association of Geographers, La Crosse, WI, November 3, 2018.
- Dony C. (2018) Engaging Undergraduate Students in Research Activities. Sponsored by the SEDAAG Education Committee. Annual Meeting of the Southeastern Division of the American Association of Geographers, Johnson City, TN, November 18-19, 2018.
- Solem M., Theobald R., Dony C., Chang C-H. (2019) Transformative Research in Geography Education Panel. Annual Meeting of the American Association of Geographers. Washington, DC, April 3-7, 2019.

### **Potential RCN partners**

This RCN would benefit from additional individual faculty perspectives from a broader range of universities. Other partnerships that were considered were with the **World Geospatial Industry Council**, which was founded less than a year ago by Esri's co-founder. This council may provide perspectives on needed or lacking skills at the convergence of geography and computer science.

### **Implications and value of an EG-RCN**

The long-term implications of an EG-RCN would be most significant in terms of broadening participation and curriculum development. First, a known strategy to increase students' interest and retention in courses that involve computational thinking, is to provide hands-on exercises and examples of interest to a wider range of undergraduate geography majors. However, most courses lack this breadth because of a faculty's expertise in one area of geography. Developing hands-on exercises and curriculum from other subfields of geography is time consuming and requires that particular expertise. Consequently, an EG-RCN would be well-positioned to motivate faculty to share their use-cases, data, and curriculum content with the purpose of broadening and retaining participation in these courses. Second, an important discussion so far has been around developing a more gradual learning path in geocomputation. Most geography programs either don't have the capacity for teaching any computational curriculum, or have one course in which students are expected to learn advanced topics and concepts in GIScience, and to learn a computer programming language (often for the first time). "Micro-insertions" of computational curriculum in other courses of their program may expose *all* geography students and also lay a foundation for a gradual learning pathway. The EG-RCN could compile a number of such micro-insertions adoptable by any geography program.

## NSF RCN Annual Report

### 1. Facilitate collaborative research among geographers and STEM education researchers.

Di Wilmot	South Africa	Professor, Dean of Education, Faculty of Education Rhodes University
Duan Yushan	China	Professor, Vice Present and Secretary General of Geography Teaching Society of China, Director of Shanghai Geography Education and Teaching Research Base
Dennis Tam	Macau	Educator in Macau
Stien Matakupan	Indonesia	Sampoerna University, English Language Teaching, Faculty Member
Gillian Kidman	Australia	Associate Professor in Science Education, Monash University
Nicola Walshe	UK	Deputy Head of the School of Education and Social Care (Cambridge)   Principal Lecturer in Education
Jerry Mitchell	USA	Research Professor, Department of Geography Professor, Research, Universtiy of South Carolina
Kelvin Williams	USA (IB)	Head of Curriculum Development, Diploma and Career-related Programme Development
Chang Chew Hung	Singapore	Chief Planning Officer of National Institute of Education, Nanyang Technological University. Associate Professor at the Humanities and Social Studies Education Academic Group at NIE, NTU.
Andy Wi	Singapore	Research Associate at the National Institute of Education, Nanyang Technological University
Shyam Singh	Singapore	Research Assistant at the National Institute of Education, Nanyang Technological University
Francis Ess	Singapore	Teacher
Josef Tan	Singapore	Senior Specialist, Geography Unit, Curriculum Planning and Development Division, Ministry of Education

### 2. Attract more diverse cohorts of graduate students to Ph.D. programs in Geography Education.

Mohd Faisal Aman	Singapore	PhD Student	Male	Malay
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### **3. Increase research productivity and the knowledge base in geography education.**

#### **Publication:**

1. Chang, C.H., Wi, A., & Singh, S. (In process). Developing a hypothetical framework to describe school Geography Curricula around the world.

#### **Conference Presentation:**

1. Chang, C.H. (2019, MAR). Learning Geography in Challenging Times – learning to know, learning to do, learning to live together and learning to be. Keynote Address, EUROGEO annual meeting 2019, Paris, France.
2. Chang, C.H. (2019, April). Transformative Research in Geography Education: Developing a framework to describe school Geography Curricula around the world. Paper presented at American Association of Geographers Annual Meeting, Washington D.C., United States.

### **4. Long-term growth and stability of the RCN.**

This project analyses information from the International Charter on Geographical Education and the Belgrade Charter on Environmental Education, in addition to the curriculum documents from different countries. Therefore, we will work together with academics/educators from the respective countries to continue to analyse and develop a framework to describe school geography curricula around the world.

Please see Annex for more details about the countries' curriculum and the activities we have done.

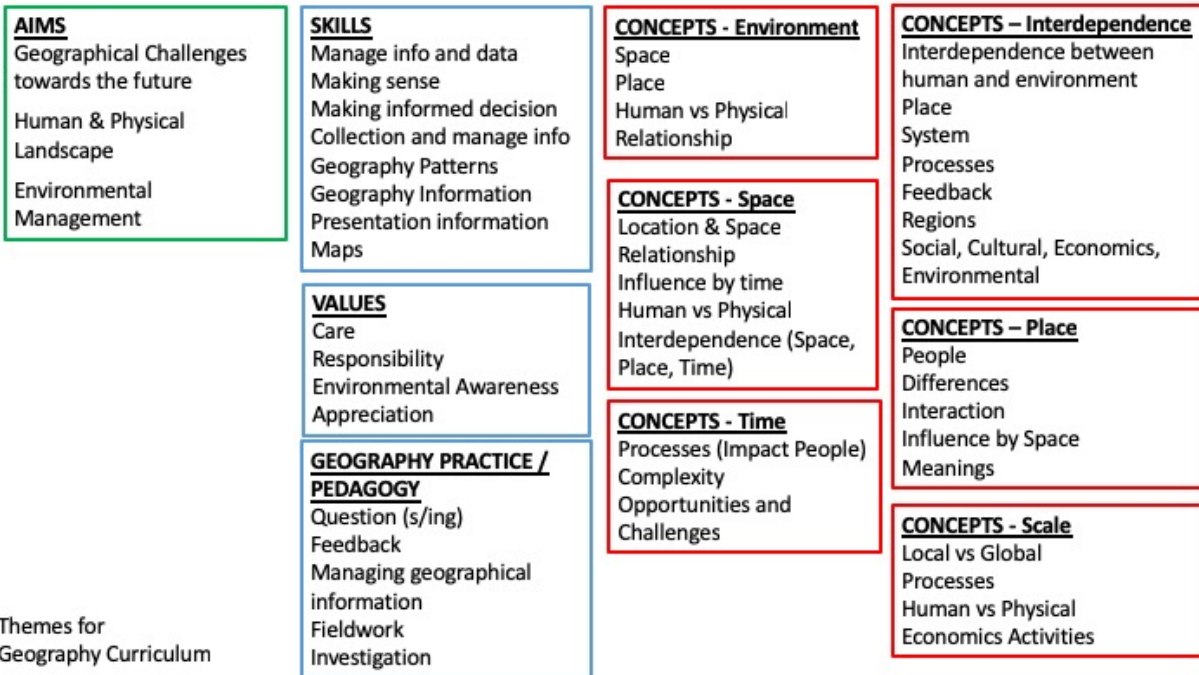
### **5. Promote the use of research to improve practice in geography education.**

The framework will help affirm the leadership that NCRGE has on geographical education discourse through the improvement of the teaching and learning of geography in education. In terms of research, it identifies the fundamental aspects of geography education such as the development of students' spatial understandings, perceptions of the environment and attitudes towards people, places and problem. In addition, it can identify the strengths of different countries, their local knowledge, new information technologies, environmental and development education, multi-cultural and global studies.

## Annex 1: Research Progress

1. Progress of Research Project
  - a. An initial framework was developed from content analysis of
    - i. 1992 International Charter on Geographical Education
    - ii. 1975 Belgrade Charter on Environmental Education
    - iii. Decade of Education for Sustainable Development (DESD) Goals
    - iv. Curriculum documents from 6 different countries documents.
      - Singapore
      - Australia
      - Sri Lanka
      - England
      - Northern Ireland
      - Wales
  - a. Analyzing and comparing both the (a) initial framework and (b) countries framework, we have identified the key aims, themes and concepts to develop the proposed curriculum framework (see Annex 1).
  - b. We have conducted a skype session on 20 February 2019 with 10 academics (together with the co-PIs and collaborators) validate the (c) proposed curriculum framework. Key discussions were:
    - a. Does the framework fit into their own countries' framework
    - b. Identify key similarities and differences based on the framework
    - c. Areas for improvements
2. Plans for the next 6 months
  - a. To present the progress at the AAG 2019 meeting on 4 April in Washington DC.
  - b. To collect more curriculum documents for comparison (target 10 curriculum cases)
  - c. To conduct a social lab in May,
    - a. Invite 10 academics from around the world
    - b. To examine and to develop the final framework
3. Achievements
  - a. In the process of writing an article to describe the initial framework (see Annex 2)
4. Budget
  - a. Still within the budget (The only amount spent is)

Annex 1: Curriculum framework based on document analysis.



Cases	Aims and outcomes
Singapore	<ul style="list-style-type: none"> <li>• Acquire knowledge of the characteristics, distribution and processes of physical and human phenomena</li> <li>• Develop a holistic understanding of physical-human relationships at local, regional and global scales</li> <li>• Gain geographical insights and global awareness into future challenges through the study of current issues and their management</li> <li>• Become inquiring and self-directed learners who ask geographical questions and seek understanding through the collection and analysis of geographical information</li> <li>• Develop skills in communicating and applying geographical knowledge; and</li> <li>• Make informed judgements and sound decisions through the analysis, synthesis and evaluation of geographical information.</li> </ul>
Australia	<p>To ensure that students develop:</p> <ul style="list-style-type: none"> <li>• a sense of wonder, curiosity and respect about places, people, cultures and environments throughout the world</li> <li>• a deep geographical knowledge of their own locality, Australia, the Asia region and the world</li> <li>• the ability to think geographically, using geographical concepts</li> <li>• the capacity to be competent, critical and creative users of geographical inquiry methods and skills</li> </ul>

	<p>as informed, responsible and active citizens who can contribute to the development of an environmentally and economically sustainable, and socially just world.</p>
<p>Sri Lanka</p>	<ol style="list-style-type: none"> <li>1. Lives with an awareness of the nature and processes of the environment in which he lives.</li> <li>2. Reviews the basic concepts and methodologies that help to understand the physical and human landscape.</li> <li>3. Acts with awareness of the components, characteristics and processes in the physical and human landscape.</li> <li>4. Acts with awareness of the manner in which the physical and human interaction impacts on the geographical environment.</li> <li>5. Uses geographical techniques to collect, analyze, interpret and present data and information.</li> <li>6. Applies the holistic approach in understanding, analyzing and interpreting the physical and human landscape.</li> <li>7. Acts with sensitivity inculcating positive attitudes helpful in conserving and maintaining the physical and human landscape.</li> <li>8. Acts with an awareness of the earth and its people in order to promote a harmonious interrelationship between the environment and society.</li> <li>9. Fosters special survival skills that help to overcome challenging life situations.</li> <li>10. Develops skills needed for active participation in the world of work.</li> </ol> <p>National Goals</p> <ol style="list-style-type: none"> <li>1. Nation building and the establishment of a Sri Lankan identity through the promotion of national cohesion, national integrity, national unity, harmony and peace and recognizing cultural diversity in Sri Lanka’s plural society within a concept of respect for human dignity.</li> <li>2. Recognizing and conserving the best elements of the nation’s heritage while responding to the challenges of a changing world.</li> <li>3. Creating and supporting an environment imbued with the norms of social justice and a democratic way of life that promotes respect for human rights, awareness of duties and obligations and a deep and abiding concern for one another.</li> <li>4. Promoting the mental and physical well- being of individuals and a sustainable life style based on respect for human values.</li> <li>5. Developing creativity, initiative, critical thinking, responsibility, accountability and other positive elements of a well- integrated and balanced personality.</li> <li>6. Human resource development by educating for productive work that enhances the quality of life of the individual and the nation and contributes to the economic development of Sri Lanka.</li> </ol>

	<p>7. Preparing individuals to adapt to and manage change, and to develop capacity to cope with complex and unforeseen situations in a rapidly changing world.</p> <p>8. Fostering attitudes and skills that will contribute to securing an honorable place in the international community, based on justice, equality and mutual respect. (Adapted from National Education Commission Report -2003).</p>
<p>England</p>	<p>The national curriculum for geography aims to ensure that all pupils:</p> <ul style="list-style-type: none"> <li>• develop contextual knowledge of the location of globally significant places – both terrestrial and marine – including their defining physical and human characteristics and how these provide a geographical context for understanding the actions of processes</li> <li>• understand the processes that give rise to key physical and human geographical features of the world, how these are interdependent and how they bring about spatial variation and change over time</li> <li>• are competent in the geographical skills needed to: <ul style="list-style-type: none"> <li>- collect, analyse and communicate with a range of data gathered through experiences of fieldwork that deepen their understanding of geographical processes</li> <li>- interpret a range of sources of geographical information, including maps, diagrams, globes, aerial photographs and Geographical Information Systems (GIS)</li> <li>- communicate geographical information in a variety of ways, including through maps, numerical and quantitative skills and writing at length.</li> </ul> </li> </ul>
<p>Northern Ireland</p>	<p>Geography develops pupils as individuals by:</p> <ul style="list-style-type: none"> <li>• helping them explore their sense of place and belonging, in relation to their own locality and the wider world;</li> <li>• enabling them to develop an appreciation for physical and human diversity and gaining some understanding of the needs and perspectives of others.</li> </ul> <p>Geography develops pupils as contributors to society by:</p> <ul style="list-style-type: none"> <li>• helping them gain a sense of themselves as social beings and exploring how they relate to one another and their environments;</li> <li>• making them aware of values and lifestyles that are different from their own and helping them make reasoned judgements in relation to a wide range of issues.</li> </ul> <p>Geography develops pupils as contributors to the economy and environment by:</p> <ul style="list-style-type: none"> <li>• helping them gain an awareness of our place in a changing local and global economy;</li> <li>• challenging them to explore the consequences of our interactions with the environment;</li> </ul>

	<ul style="list-style-type: none"> <li>• making them aware of the need for change to be sustainable and the importance of thinking globally, acting locally.</li> </ul>
Wales	<p>Curriculum Cymreig (7–14) and Wales, Europe and the World (14–19)</p> <ul style="list-style-type: none"> <li>• Learners aged 7–14 should be given opportunities to develop and apply knowledge and understanding of the cultural, economic, environmental, historical and linguistic characteristics of Wales.</li> <li>• Learners aged 14–19 should have opportunities for active engagement in understanding the political, social, economic and cultural aspects of Wales as part of their 14–19 Learning Core entitlement. For 14–19 learners, this is a part of the world as a whole. For 14–19 learners, this is a part of their Learning Core entitlement and is a requirement at Key Stage 4.</li> <li>• Personal and social education: Learners should be given opportunities to promote their health and emotional well-being and moral and spiritual development; to become active citizens and promote sustainable development and global citizenship; and to prepare for lifelong learning.</li> <li>• Careers and the world of work: Learners aged 11–19 should be given opportunities to develop their awareness of careers and the world of work and how their studies contribute to their readiness for a working life. For 14–19 learners, this is a part of their Learning Core entitlement and is a requirement at Key Stage 4.</li> </ul>

## Annex 2: Draft of paper being prepared.

Developing a hypothetical framework to describe school Geography Curricula around the world.

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*National Institute of Education, Nanyang Technological University, Singapore*

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### ABSTRACT

Geographical education is practiced differently around the world, as there are many factors (e.g., geographical location) and contexts (e.g., political, cultural) that countries may face in terms of planning and developing their geography curriculum. Invariably, each country has a different curriculum for school geography. The International Charter on Geographical Education (*Charter*) outlined some key research questions that geography educators around the world should engage with and the contribution, outcomes and research agenda of geographical education (IGU-CGE, 2016). Using the *Charter* as a basis, this study seeks to compare different curricula around the world (by identifying the core geographical concepts, skills and attitudes of geography education) with a view of developing a framework that can allow researchers and teachers to exchange ideas on how to teach geography better. Through content analyses of curriculum documents, international declarations on geographical education and a thorough literature review on previous studies of international comparative studies of geography curriculum, this study will examine the levels at which geography is taught, the intended cognitive and affective learning outcomes, the instructional approaches, the assessment practices, and even the teacher professional development opportunities that are described in the documents in each country's case. Consequently, the study seeks to develop a robust framework that can be used by geography educators that seek to compare school geography practices around the world. In addition, the study will attempt to describe the essence of geographical education within an international context, which will have applicability for researchers developing an international assessment item, for instance. The research project will have important contributions to the international geographical education community as well as geographical education in Singapore.

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## Preview of Award 1560862 - Annual Project Report

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### Cover

Federal Agency and Organization Element to Which Report is Submitted:	4900
Federal Grant or Other Identifying Number Assigned by Agency:	1560862
Project Title:	RCN: Transformative Research in Geography Education
PD/PI Name:	Michael N Solem, Principal Investigator Richard G Boehm, Co-Principal Investigator
Recipient Organization:	Association of American Geographers
Project/Grant Period:	06/01/2016 - 05/31/2021
Reporting Period:	06/01/2018 - 05/31/2019
Submitting Official (if other than PD\PI):	Michael N Solem Principal Investigator
Submission Date:	05/11/2019
Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	Michael N Solem

### Accomplishments

#### \* What are the major goals of the project?

This RCN project has six major goals:

1. Catalyze research planning with strong potential to result in transformative research projects in geography education.



2. Facilitate collaborative research among geographers and STEM education researchers.
3. Attract more diverse cohorts of graduate students to Ph.D. programs in Geography Education.
4. Increase research productivity and the knowledge base in geography education.
5. Secure the long-term growth and stability of the RCN.
6. Promote the use of research to improve practice in geography education.

The primary mechanism for pursuing the goals under this project is a grant program administered by the National Center for Research in Geography Education (NCRGE). This grant program is designed to catalyze the formation of research groups working in different thematic areas of geography education research. Their research planning activities are intended to position them for long-term work connected to the Road Map Project's agenda for transformative research. See appended group reports for details.

**\* What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?**

Major Activities: In the third year of the project, NCRGE awarded three grants to support research groups in the areas of 1) Geocomputation, 2) Geography and Civics, and 3) International Curriculum Frameworks.

Their activities and accomplishments in relation to the six major project goals are summarized below and in the appended group reports.

### **1. Geocomputation**

This group assessed the current capacity for and barriers to an inclusive geocomputational curriculum in U.S. higher education. A second goal was to plan a research strategy to design geocomputational curriculum that is inclusive, supports teacher learning, and can be measured for effectiveness. This investment will set the stage for a longer-term research agenda around these broader objectives and will identify experts beyond universities to expand the network to all levels of geography education. Building such a research agenda will ensure future generations of geographers and geospatial industry professionals are prepared to contribute to the national innovative ecosystem.

### **2. Geography and Civics**

This group focused on geography and civics education in the context of decennial procedures of apportionment and redistricting at the federal level, which will next take place following the 2020 Census. In this project, researchers exposed multiple audiences to geographic concepts and skills using interactive tools and methods, including giant state maps furnished by National Geographic, accessible digital presentation software, and interactive geospatial technology tools. Their objective was to add to knowledge about the best approaches for extending geospatial analysis into secondary schools and about the most effective ways to bring geography into public policy discussions.

### **3. International Curriculum Frameworks**

This group developed a framework supporting future international comparative analyses of geography curricula in schools. The group examined international geography curriculum documents with a view of identifying the topics and skills (through content analyses and literature review) required for each syllabus and examine how they are arranged in the curriculum. These identified topics were then categorized and combined into one framework that enables researchers to compare the similarities and differences in how countries set goals for student learning outcomes in school geography. In addition to

facilitating exchange of ideas among researchers and teachers on how to teach geography better, this work will inform NCRGE's Trends in International Geography Assessment Study, which is working to introduce an optional geography module in the 2023 Trends in International Mathematics and Science Study.

Specific Objectives:

Significant Results:

Key outcomes or Other achievements:

**\* What opportunities for training and professional development has the project provided?**

Refer to attached individual reports from the three research groups funded by the 2018 Transformative Research in Geography Education program.

**\* How have the results been disseminated to communities of interest?**

For the 2019 AAG Annual Meeting in Washington, DC, the National Center for Research in Geography Education organized session proposals for a special track of sessions on Transformative Research in Geography Education. This was the third of a planned series of activities at the AAG Annual Meeting to raise the visibility of research in geography education, grow the research network, and provide productive spaces for discussion about geography education research and the notion of what makes research in the field potentially transformative. Additional dissemination is reported in the attached individual reports from the three research groups funded by the 2018 Transformative Research in Geography Education program.

**\* What do you plan to do during the next reporting period to accomplish the goals?**

NCRGE will award a second round of Transformative Research grants in the summer of 2019. The RFP is available at [www.ncrge.org/funding](http://www.ncrge.org/funding) with a submission deadline of May 15, 2019.

**Supporting Files**

Filename	Description	Uploaded By	Uploaded On
NSF RCN Annual Report_1May2019.pdf	1. Group report: International Curriculum Frameworks.	Michael Solem	05/11/2019
NSF RCN Annual Report - EGRCN.pdf	2. Group report: Geocomputation.	Michael Solem	05/11/2019
NCRGE_NSF_TransformativeResearch_GeoCivics_Report_May2019.pdf	3. Group report: Geography and Civics.	Michael Solem	05/11/2019
NCRGE Transformative Research Session Track_AAG 2019.pdf	4. NCRGE session track.	Michael Solem	05/11/2019

**Products**

**Books****Book Chapters****Inventions****Journals or Juried Conference Papers**

Boehm, R.G., Solem, M., and Zadrozny, J (2018). The Rise of Powerful Geography. *The Social Studies*. 109 (2), . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Solem, M. & Boehm, R.G. (2018). Research in geography education: moving from declarations and road maps to actions.. *International Research in Geographical and Environmental Education*.. 27 (3), . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Solem, M., Stoltman, J., Lane, R., Bourke, T., Chang, C., and Viehrig, K. (2018). An Assessment Framework and Methodology for a Trends in International Geography Assessment Study (TIGAS). *Geographical Education*. 31 . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

**Licenses****Other Conference Presentations / Papers****Other Products****Other Publications****Patents****Technologies or Techniques****Thesis/Dissertations****Websites****Participants/Organizations****What individuals have worked on the project?**

Name	Most Senior Project Role	Nearest Person Month Worked
Solem, Michael	PD/PI	1
Boehm, Richard	Co PD/PI	1
Zadrozny, Joanna	Graduate Student (research assistant)	1

**Full details of individuals who have worked on the project:****Michael N Solem**

**Email:** msolem@txstate.edu

**Most Senior Project Role:** PD/PI

**Nearest Person Month Worked:** 1

**Contribution to the Project:** PI

**Funding Support:** N/A

**International Collaboration:** No

**International Travel:** No

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**Richard G Boehm**

**Email:** rb03@txstate.edu

**Most Senior Project Role:** Co PD/PI

**Nearest Person Month Worked:** 1

**Contribution to the Project:** Co-PI

**Funding Support:** N/A

**International Collaboration:** No

**International Travel:** No

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**Joanna Zadrozny**

**Email:** J\_z37@txstate.edu

**Most Senior Project Role:** Graduate Student (research assistant)

**Nearest Person Month Worked:** 1

**Contribution to the Project:** Provided research assistance to the project directors.

**Funding Support:** Grosvenor Center for Geographic Education, Texas State University.

**International Collaboration:** No

**International Travel:** No

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**What other organizations have been involved as partners?**

Nothing to report.

**What other collaborators or contacts have been involved?**

Nothing to report

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## Impacts

**What is the impact on the development of the principal discipline(s) of the project?**

Each of the three research groups established in 2018 are pursuing activities that have significant potential to have transformative impacts on geography education, including new theories of geography learning and approaches to curriculum development, teacher education, and assessment practices.

**What is the impact on other disciplines?**

This RCN is forging research collaborations between geographers and STEM educational researchers, thereby opening opportunities for interdisciplinary insights on critical educational research questions and challenges.

**What is the impact on the development of human resources?**

RCN projects engage students and practitioners in research training activities. NCRGE will extend the work of the RCN by sponsoring additional research workshops and conferences for early career scholars and graduate students.

**What is the impact on physical resources that form infrastructure?**

Nothing to report.

**What is the impact on institutional resources that form infrastructure?**

Nothing to report.

**What is the impact on information resources that form infrastructure?**

Nothing to report.

**What is the impact on technology transfer?**

Nothing to report.

**What is the impact on society beyond science and technology?**

Nothing to report.

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**Changes/Problems****Changes in approach and reason for change**

Nothing to report.

**Actual or Anticipated problems or delays and actions or plans to resolve them**

Nothing to report.

**Changes that have a significant impact on expenditures**

Nothing to report.

**Significant changes in use or care of human subjects**

Nothing to report.

**Significant changes in use or care of vertebrate animals**

Nothing to report.

**Significant changes in use or care of biohazards**

Nothing to report.