Robert Andrew Kolvoord

Work Address
College of Integrated Science and Engineering
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Education

University of Virginia (Charlottesville, VA)
Bachelor of Arts in Physics with High Distinction, 1983

University of Virginia (Charlottesville, VA)
Master of Science in Materials Science, 1985

Cornell University (Ithaca, NY)
Doctor of Philosophy in Theoretical and Applied Mechanics, 1990

Professional Experience

Founding Dean, College of Integrated Science and Engineering (2012 – present, Interim Dean 07/2012- 03/2014), Chief Innovation Office (10/2019 – present)
Formed new college initially consisting of 85 faculty members and 1800 students across 5 undergraduate majors and 2 graduate degree programs.

Interim Director/Head, School/Department of Engineering (2011 – 2013)
Led new Engineering degree program through graduation of its first students and initial ABET accreditation. Responsible for 15 faculty and 400 students.

Professor (2003-present), Assoc. (1999 – 2003), Asst. Professor (1995-1999)
James Madison University
Faculty member in the Integrated Science and Technology program. Joint appointment with College of Education in 2000. Co-led Study Abroad in Malta, 2006, Sabbatical Leave 2006-07. Led Semester in London Spring 2008. Co-developer of the Sustainable Environmental Resources Management MSc Program with the University of Malta

Selected Courses taught**:**

Analytical Methods I, II, III - lower division courses integrating calculus, physics, statistics, and computing**.** I have participated in the design of AM I and II and led the course team for AM II. With a colleague, I created a "lab leader" program to involve undergraduates in teaching**.**

- Applications of GIS in Resource Management – graduate level course
- GIS and the Environment – a senior/graduate level seminar on the use of GIS in Environmental Applications
- Imagery and Data Display – a graduate level seminar on the use of data visualization in education
- Modeling and Simulation – graduate course on the use of numerical modeling and simulation techniques
- Multimedia Industry - an upper division course in multimedia design and production.
- Data Visualization – senior seminar on data visualization tools and techniques, including image processing and GIS.
- Science of the Planets – introductory planetary astronomy for pre-service teachers.
- Simulation and Modeling - an upper division course in discrete and continuous modeling and simulation.
- Spatial Thinking – an undergraduate geography course

- Sustainability – Co-taught seminar course with Profs. J. Miles, A. Townsend and C.J. Brodrick as part of Study Abroad in Malta.

Selected Committee work:

JMU Diversity Task Force (Co-chair), JMU Task Force on STEM Education (Chair), JMU Intellectual Property Committee (Chair), JMU Distance Learning Steering Committee (Chair), CISAT Technology Users' Group (Chair), CISAT Strategic Planning Group for Technology (Chair), ISAT Personnel Action Committee (PAC) (Chair), ISAT Foundations Committee (Chair), ISAT Information Systems Group (Chair), Geographic Science Curriculum Design Steering Committee (Chair), ISAT Who Are We and Integration Strategic Planning Committee (Chair), ISAT Assessment, ISAT Steering, ISAT Graduate Committee, JMU Centennial Commission, JMU Committee on Academic Programs (CAP), Multiple Search Committees: including Dean of Educational Technology, Dean of CISAT, Vice Provost for Research (Chair) and Provost/Vice-President for Academic Affairs; JMU On-line Task Force

Masters Students Advised:

Diana German, Anthony Hertzler, Kevin Zdancewicz

Affiliate Faculty Member, International Masters Programme, University of Malta – 2011 – present.

Co-Director and Founder, Center for STEM Education and Outreach, James Madison University (2007-2014)

Co-created and helped to lead Center for coordinating JMU activities impacting K-12 science, technology, engineering and mathematics.

Associate Dean for Educational Technologies, James Madison University (1999-2000)

Administered central Educational Technology support for campus. Supervised college liaisons and central instructional technology development facility. Campus-wide responsibility for distance learning.

Director, CISAT Medialab, James Madison University (1996 - 1999)

Director of a multimedia production facility. Manage a staff of two professionals and 8-10 student assistants in providing instructional technology design and support. Pursue external funding for projects and develop innovative applications of educational technology.

Senior Research Associate, Univ. of Arizona (1994–1995)

Directed Hands-On Image Processing project funded by the Annenberg/CPB Math and Science Project, managed curriculum development and publication, evaluated program effectiveness in schools, and developed external funding opportunities for the Image Processing for Teaching project

Associate Director, Center for Image Processing in Education (1992-1995)

Co-founder of the Center, managed financial affairs and directed outreach and development efforts. Co-director of NSF-funded project in developing technology curriculum

Research Associate, University of Arizona (1990-1994)

Pursued original scientific research on planetary rings and planetary formation

Directed curriculum development and electronic outreach efforts, managed on-site evaluation process, and mentored teachers for the Image Processing for Teaching project

Imaging Team Associate, Galileo Space Probe, NASA (1990-1992)
Performed data support and analysis tasks for the Galileo project as the spacecraft completed its Earth-Moon and Asteroid Encounters

Grants Awarded

Principal Investigator, Hands-on Image Processing Project, funded by the Annenberg/CPB Math and Science Reform Project, $515,000, June 1993-December 1996.

Co-Principal Investigator, Image Processing for Technological Education, funded by the National Science Foundation's Advanced Technological Education program, $1,250,000, January 1995 - December 1997. Renewal funding of $700,000 for March 1997-September 1999.

Principal Investigator, Clean Cities CD-ROM directory. Funded by IRI, Inc. for the United States for the Department of Energy $25,649, June 1996 - May 1997.

Principal Investigator, Page County Economic Development CD-ROM. Funded by Page County, VA $7,865. Nov. 1997 - Oct 1998. Additional funding of $3,911 for the period Sept. – Dec. 1998.

Principal Investigator, Teacher Technology Training, funded by the Harrisonburg City Public Schools, $14,591, January 1999 – December 1999. Renewed for $19,255 for 2000, $18,343 for 2001, and $18,293 for 2002. Additional funding of $6,056 provided for 2005-2006 school year.

Principal Investigator, Project VISM – Visualization in Science and Math, funded by the National Science Foundation's Teacher Enhancement program, $766,388, March 1999 – August 2004.

Principal Investigator, Great Outdoors, Digital Indoors, funded by Eisenhower Professional Development funds through the State Council of Higher Education in Virginia, $40,000, July 2001- June 2002. Renewed for $50.459 for July 2002-June 2003. Renewed for $26,705 for July 2003 – August 2004.

Co-Principal Investigator, NASA RISE at JMU: Contributions to a State Remote Sensing Data Venter, $46,500 from NASA for 2002 activities.

Co-Principal Investigator, Project GRASP (subcontractor to Science Museum of Virginia). Funded by Virginia No Child Left Behind Funding, $33,646, August 2005 – August 2006.

Principal Investigator, National Center for Rural STEM Education. Funded by the United States Department of Education, $297.300, October 2005 – September 2007.

Principal Investigator, Gordon Conference Mini-Grant on Data Visualization (with colleagues at Northwestern Univ.), $5,000. October 2005 – June 2006.

Principal Investigator, Project GRASP 2. Funded by Virginia No Child Left Behind Funding, $136,024, August 2006 – August 2007.

Principal Investigator, Bridging the Valley. Funded by the National Science Foundation's STEM Talent Expansion program, $2,468,121, September 2008 – August 2013.

Principal Investigator, Gordon Conference Mini-Grant on Data Visualization (with colleagues at Michigan Tech and Pacific (OR) Universities), $6,000. October 2009 – June 2011.

Principal Investigator, Video Case Studies of the Impact of GIS on Spatial Thinking. Funded by Northwestern University (as a subcontract to National Science Foundation funding), $25,035. January 2010 – August 2012.

Principal Investigator, 3rd National Summit on GIS in K-12 and Geography Teacher Workshop. Funded by the Virginia Geographic Alliance, $8.700, January 2010 – October 2010.

Principal Investigator, The Impact of GIS on Students' Spatial Thinking. Spatial Intelligence and Learning Center. Funded by Temple Universty (as a subcontract to National Science Foundation funding), $140,000 September 2011 – August 2016.

Principal Investigator, 4th National Summit on GIS in K-12 and Geography Teacher Workshop. Funded by the Virginia Geographic Alliance, $12,580, March 2012 – October 2013.

Principal Investigator, GIS Analysis of Health Indicators in Harrisonburg/Rockingham County, $3,500, Funded by Rockingham Memorial Hospital, March 2012 – December 2012

Principal Investigator, Support for Gordon Research Conference Visualization Workshops, $49,952, Funded by NASA, October 2012 – September 2013.

Principal Investigator, Cognitive and Neural Indicators for School-based Improvement in Spatial Problem Solving, Collaborative project with D. Uttal (Northwestern) and A. Green (Georgetown), $449,784 (total funding $1,503,261), Funded by NSF, January 2015 – December 2018.

Principal Investigator. Grand Challenges in Visualization in Science and Education: Gordon Research Conference, Workshops and Visionary Grants to Advance Visualization Research in Science and Education, $198,190, Funded by NASA, May 2015 – April 2018.

Principal Investigator. Neural and cognitive strengthening of conceptual knowledge and reasoning in classroom-based spatial education. Collaborative project with D. Uttal (Northwestern), A. Green (Georgetown), and D. Kraemer (Dartmouth), $139,867 (total funding $486,460). Funded by NSF, April 2017 – March 2024.

Principal Investigator. Adapting and Implementing a Geospatial High School Course in Career and Technical Education Clusters in Urban Settings. Collaborative project with D. Uttal (Northwestern), and S. McGee (Learning Partnership), $169,376 (total funding $1,999,937). Funded by NSF, January 2018 – December 2023.

Principal Investigator, Developing neural and behavioral measures to predict long-term STEM learning outcomes from a high-school spatial learning course. Collaborative project with D. Uttal (Northwestern), A. Green (Georgetown), and D. Kraemer (Dartmouth), $86,683 (total funding $1,358,962), Funded by NSF, August 2022-July 2025.

Co-Principal Investigator, Data in Space and Time: Supporting Learners in Understanding and Analyzing Spatiotemporal Data. Collaborative project with D. Uttal

(Northwestern), Chad Dorsey (PI, Concord Consortium), $86,683, (total funding $1,053,057), Funded by NSF, October 2022- September 2025.

Professional Service

Consultant/Advisor for the following projects:

- Advisory Board for Model-BEST (Building Enhanced Scientific Thinking), 2017 – present
- Advisory Board for Socio-Environmental Science Investigations (SESI) Using the Geospatial Curriculum Approach with Web GIS**,** 2017-present
- National Advisory Board on GIS in Education for ESRI – 2012 - 2015
- BSCS (MOTIV Project on Student Motivation) – 2012-2015
- LaSalle University – Philadelphia, PA – Program Review, ISBT – 2012
- National Emergency Training Center, Emmittsburg, MD, GIS Training Design – 2012
- Mary Washington University STEP Grant – 2011-2014
- National Geographic Society Road Map Project – 2011-2013
- Augmented Reality Project – MIT – 2008 - 2010
- Project OVERSPACE – Community College GIS Curriculum – 2007 - 2012
- Department of Defense Dependent Schools, Germany, 1999-2006
  15 workshops and 10 weeks of co-teaching/consulting
- East Carolina University Computational Science Project, 2002 - 2005
- Northwestern University GIS Development Project, 2004 –2007
- Education Development Center's Portals Project, 1997-1999
- Technical Education Research Corporation, Model Schools Project
- Michigan Gateways Project, Michigan State University
- Planetary Society/NSTA Scope and Sequence Project
- Cray Academy, Chippewa Falls, WI
- University of California - San Diego, PCAST Program
- University of Arizona APEX Program, 1994-1995
- University of Arizona MedStart Program, 1994-1995
- Pima Community College Talent Search Program, 1994
- Arizona Science and Math Teachers' Academy, 1994

Member, Spatial Intelligence and Learning Center (NSF-funded, hosted by Temple University), 2008 – 2015.

Conference Chair (2015) and Vice-Chair (2013), Gordon Research Conference – Visualization in Science and Education.

Organized 1st, 2nd, 3rd and 4th Annual Summit on GIS in K-12, held at James Madison University, Harrisonburg, VA, 2008-2010, 2012.

Chair, Planetary Society Fellowship Selection Committee, 1992-1995 Educational Materials Evaluation Committee, Division for Planetary Sciences, 1991-1995
Co-director, TeachNet - School-University Electronic Interaction Network; 1989-1990
Consultant, SuperQuest '90- Cornell National Supercomputer Facility Education Outreach Subcommittee, Division for Planetary Science, 1988 - 1995

Reviewer, Civilian Research and Defense Foundation, Icarus, Nature, National Aeronautics and Space Administration, National Science Foundation, International Science Foundation, Journal of Geography, Journal of Geography in Higher Education

National Science Foundation Site Reviewer for Systemic Initiative Grants

Professional Associations

American Astronomical Society (Division for Planetary Science)
American Society for Engineering Education
Association of American Geographers

International Society for Technology in Education
National Council for Geographic Education
National Science Teachers Association
Sigma Xi
Virginia Association of Science Teachers
Virginia Society of Technology in Education

Areas of Interest

Science and Technology Education (curriculum reform, applications of technology, assessment, novel applications of computers, media, and networks to discipline-specific education)
Applications of Geospatial Tools in Education (curriculum development, professional development and research on student spatial thinking skills)
Scientific Visualization(image processing, educational applications, modeling and simulation)
Computing (educational applications , visualization, numerical methods, animation, simulation, image processing,)
Solar System Dynamics (planetary rings, orbital evolution, origin and evolution of the solar system)

Awards

Echols Scholar, 1979-1983, University of Virginia
Intermediate Honors, 1981, University of Virginia
Phi Beta Kappa, 1983
Letter of Commendation for Science Education, 1983, Physics Department, University of Virginia
Dupont Fellowship, 1983-1984, University of Virginia
NASA Graduate Fellowship, 1987-1990, Cornell University
HIP Biology (Executive Editor) - Curriculum Administrator Top 100, Technology and Learning Award for Excellence, Technology and Learning Software of the Year Award, Ed Press software award
HIP for Educators (Executive Editor) - Technology and Learning Software of the Year Award
Project Kaleidoscope Faculty of the 21st Century, Class of 1997
HIP Mathematics (Executive Editor) – Technology and Learning Award for Excellence
Named Outstanding Faculty Member by ISAT Class of 1999, 2003 and and Outstanding Teacher by ISAT Class of 2000, 2001, 2002, and 2005
College of Integrated Science and Technology Inaugural Distinguished Service Award (2001)
Best Theory Paper (w/Mike Charles) at the Society for Information Technology in Education 2001 Conference
Medal for Excellence in Teaching and Learning, Heidelberg Model Schools Project, Department of Defense Dependent Schools, 2002
JMU Alumni Association Outstanding Faculty Award, 2003
Provost's Award for International Education, 2007
Virginia Association of Science Teachers, Outstanding non K-12 Science Educator, 2007
Shenandoah Valley Technology Council Innovation in K-12 Education Award, 2007
Honorable Mention, Governor's Award for Innovative Use of Technology in K-12 Education, 2010
Virginia State Council of Higher Education in Virginia, 2011 Outstanding Faculty Award, Teaching with Technology
ESRI, Special Achievement in GIS, 2012, for work with GIS in K-12 Education in Virginia
Virginia Math and Science Coalition "Programs that Work" award for the Geospatial Semester, 2014
Governor's Technology Award for the Innovative Use of Technology in Education, CoVITS, 2015

USGIF Academic Achievement Award, Geospatial Semester, 2016
Best Paper, Journal of Geography, 2016, National Council for Geography Education
University Economic Development Association 2021 Judge's Award for JMU/BRCC/Merck Public Private Partnership in Workforce Development (our college has partnered in supporting this partnership)

Publications

Kolvoord, R.A. (1985). Nucleation Theory: Steady State and Kinetic. M.S. Thesis, University of Virginia, Charlottesville, Va.

Kolvoord, R.A. and J.A. Burns (1988). Numerical Simulations of Narrow Planetary Rings: An Animation. Celestial Mechanics **45**, 321-322.

Burns, J.A., R.A. Kolvoord and D.P. Hamilton (1989). An Assessment of Potential Hazards to the Cassini Spacecraft from Debris along Satellite Orbits. Cassini Mission Announcement of Opportunity, OSSA-1-89. JPL PD 699-11, Volume 13, 6-1 - 6-20.

Kolvoord, R.A., J.A. Burns and M.R. Showalter (1990). Periodic features in Saturn's F ring: evidence for nearby moonlets. Nature **345**, 695-697.

Kolvoord, R.A. (1990). Saturn's F Ring: Imaging and Simulation. Ph.D. Dissertation, Cornell University, Ithaca, N.Y.

Burns, J.A. and R.A. Kolvoord (1990). Supercomputer as Observatory? A Search for Moons in Planetary Rings Using the Cornell National Supercomputer Facility. Engineering: Cornell Quarterly **25**, 7-13.

Kolvoord, R.A. and J.A. Burns (1991). Embedded Moonlets: The Holy Grail of Planetary Ring Research. In **NASA Planetary Geosciences 1989-1990 (NASA SP-508)** Eds. M.T. Zuber, O.B. James, J.I. Lunine, G.J. MacPherson and R. J. Phillips.

Kolvoord, R.A. and J.A. Burns (1992). Three-Dimensional Modeling of Ring Particle-Satellite Interactions. Icarus **95**, 253-264.

Kolvoord, R.A. and J.A. Burns (1992). Collisional Simulations of Particles in a Narrow Planetary Ring. Icarus **99**, 436-447.

Kolvoord, R.A. and R. Greenberg (1992). A Critical Reanalysis of Early Planetary Accretion Models. Icarus **98,** 2-19.

Greenberg, R., R.A. Kolvoord, M. Magisos, R.G. Strom, and S.K. Croft (1993). Image Processing for Teaching. Journal of Science Education and Technology **2**, 469-480

Greenberg, R., M.C. Nolan, W.F. Bottke, and R.A. Kolvoord (1994). Collisional history of Gaspra. Icarus **104**, 87-97.

Bottke, W. F., M. C. Nolan, R. Greenberg, and R. A. Kolvoord (1994). Velocity distribution among colliding asteroids. Icarus **107,** 255-268.

Bottke, W. F., M. C. Nolan, R. Greenberg, and R. A. Kolvoord (1994). Collisional lifetimes and impact statistics of near-Earth Asteroids. In **Hazards Due to Comets and Asteroids**. Eds. T. Gehrels and M.S. Matthews.

Greenberg, R., M. Magisos, R. Kolvoord, and R. Strom (1994). Image Processing for Teaching: A National Dissemination Program. In **Proceedings of IEEE 1994 Conference on Image Processing**, IEEE Computer Press, Los Alamitos, CA.

Executive Editor, **HIP Physics Curriculum CD-ROM** (1994). Published by Tom Snyder Productions. Curriculum collection of image processing exercises for high school and college Physics

Executive Editor, **Image Processing for Teaching Sourcebook** (1994). Published by the Center for Image Processing in Education. Curriculum collection of image processing exercises for pre-college science and math education

Executive Editor, **HIP Biology I Curriculum CD-ROM** (1996). Published by the Center for Image Processing in Education. Curriculum collection of image processing exercises for high school and college Biology

Executive Editor, **HIP Biology II Curriculum CD-ROM** (1996). Published by the Center for Image Processing in Education. Curriculum collection of image processing exercises for high school and college Biology

Executive Editor, **Hands-on Image Processing CD-ROM and Video** (1996). Published by the Annenberg/CPB Math and Science Project and the Center for Image Processing in Education. Hypermedia tutorial and video for learning image processing applications in education.

Greenberg, R., M. Magisos, D. Adams, and R. Kolvoord (1996). Image Processing and Technological Education. Submitted to Journal for Technological Education.

Kolvoord, R., R. Greenberg, and D. Adams (1997). Image Processing in Technology Education. Published in the Proceedings of the 1997 Conference for Industry and Education Collaboration. American Society for Engineering Education, Washington, DC. pp. 2-6.

Executive Editor, **A&P Technologist** (1998). Published by the Center for Image Processing in Education. Curriculum collection of image processing exercises for anatomy and physiology

Executive Editor, **Discovering Image Processing** (1998). Published by the Center for Image Processing in Education. Curriculum collection of introductory image processing exercises for grades 7-9.

Executive Editor, **Camp IPX** (1998). Published by the Center for Image Processing in Education. Curriculum collection of image processing exercises for summer computer camps for middle school age students.

Kolvoord, R. (1998). Integrated Science and Technology: Information Technology Applications to New Curricula. Submitted to the National Academy of Sciences' Case Studies of Effective Uses of Information Technology.

Executive Editor, **HIP Mathematics** (1998). Published by the Center for Image Processing in Education. Curriculum collection for middle school mathematics.

Magisos, M., R. Kolvoord and S. Moore (1998). Applications of Image Analysis to Advanced Technological Education: Instructional Materials and Evaluation. Contributed Paper to the NSF Advanced Technological Education PI Meeting.

Kolvoord, R.A. (1999). Focus Section on Current and Emerging Technologies – Get the Picture: Visualization Tools for Science and Math. **Virginia Society for Technology in Education Journal**. Vol. 14(1), pp. 4-9.

Kolvoord, B. (1999). Data Visualization Tools for Science and Math. **The Journal of Mathematics and Science: Collaborative Explorations**. Vol. 2(2), pp. 175-182.

Cushman, P. and R. Kolvoord (1999). Multimedia. Section in the **McGraw-Hill Encyclopedia of Computer Science**.

Executive Editor, **Biotechnologist** (1999). Published by the Center for Image Processing in Education. Curriculum collection for community college and college biotechnology classes.

Kolvoord, R.A. (1999). Focus Section on Current and Emerging Technologies – Get the Picture: Visualization Tools for Science and Math. **Virginia Society for Technology in Education Journal**. Vol. 14(1), pp. 4-9.

Kolvoord, B. (1999). Data Visualization Tools for Science and Math. **The Journal of Mathematics and Science: Collaborative Explorations** Vol. 2(2), pp. 175-182

Charles, M. and R. Kolvoord (2001). Teacher's stages of development. In using visualization tools for inquiry-based science: The case of Project VISM. **Proceedings of SITE 2001.** Charlottesville, VA: Association for the Advancement of Computing in Education.

Grier, J, et al. (2001). Defining Long Term Goals and Setting Priorities for Education and Outreach, 2003 to 2013 in Planetary Decadal Study Community White Paper Solar System Exploration Survey, 2003-2013.
http://www.aas.org/~dps/decadal/community_panels.html

Malinowski, R., C. Klevickis, and R. Kolvoord (2001). Come See the Molecules – Using 3-D Modeling Programs to Learn Chemistry. **Learning & Leading with Technology** Vol 29(4), pp. 36-41.

Kolvoord, B. and G. Foletta (2002). Project VISM – Visualization in Science and Mathematics. **The Mathematics Teacher**, Vol 95(2), pg. 159.

Kolvoord, R.A. (2003). Science Education in Jeopardy. Guest Editorial in **The Daily News Record**. Nov. 22nd, 2003.

Kolvoord, R.A. and K. Keranen (2004). GIS for K12 Critical Thinking:Developing Fire Risk Assessment Maps. **Proceedings of the ESRI 2004 Education Users Conference.** ESRI Press, Redlands, CA.

Klevickis, C, R.A. Kolvoord, K. Giovanetti, T. Daughtrey, S. Fairchild, M. Handley and D. Peterson (2004). First Steps toward Change in Teacher Preparation for Elementary Science. **Journal for Mathematics and Science: Collaborative Efforts,** Vol 7, Part 1, pp. 37-48.

Kolvoord, R. A. (2004). Introduction. **Guiding Student Research: Making Research Happen in Your School (2005).** Published by the National Consortium of Specialized Secondary Schools of Mathematics, Science and Technology, pp. 14-19.

Kolvoord, R.A. and K. Keranen (2005). Spatial Thinking with ArcExplorer –Java Edition for Education: Applications for Grades 4-6. **Proceedings of the ESRI 2005 Education Users Conference.** ESRI Press, Redlands, CA.

Kolvoord, R.A. and K. Keranen (2005). The ABC's of GIS: Applications for Upper

Elementary Classrooms. **Cutting Ed,** Fall 2005, (Vol III-2), pp. 4-9.

Kolvoord, R.A. (2005). Introducing GIS to the Next Generation in the Virginia Geospatial Newsletter, Spring 2005 edition.

Kolvoord, R.A. (2007). The Geospatial Semester in the Virginia Geospatial Newsletter, Spring 2007 edition.

Kolvoord, R.A. (2007). Connecting Project-Based GIS Curricula with Secondary Students. Proceedings of the IGU/HERODOT Conference on Innovative Curriculum, London, England.

Kolvoord, R.A. (2008). Geospatial Technologies: Real Projects in Real Classrooms. **Knowledge Quarterly**, Vol 36(4), pp. 40-45.

Keranen, K. and R. A. Kolvoord (2008). **Making Spatial Decisions Using GIS**. ESRI Press, Redlands, CA.

Charles, M. and B. Kolvoord (2011). Geospatial Semester: Developing Students' 21st Century Thinking Skills with GIS. Paper presented at International Society for Technology in Education Annual Conference in Philadelphia, June 2011.

Keranen, K. and R. A. Kolvoord (2011). **Making Spatial Decisions With GIS, 2nd Edition**. ESRI Press, Redlands, CA.

Kolvoord, R. A., Keranen, K. (2011). Building Spatial Thinking and Decision Making Skills in Secondary Students Using GIS – The Geospatial Semester. *Learning with Geoinformation V* (pp. 61-64). Wichmann. 978-3-87907-501-0.

Kolvoord, R., Charles, M., Meadow, N. & Uttal, D. (2012). The Impact of Geospatial Technologies in a Dual-Enrollment Environment. In P. Resta (Ed.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2012* (pp. 1915-1922). Chesapeake, VA: AACE.

Kolvoord, R.A, D. H. Uttal, N.G Meadow (2012). Using video case studies to assess the impact of the use of GIS on secondary students' spatial thinking skills. Proceedings of the International Conference on Spatial Thinking and Geographic Information Science, University of Tokyo, Tokyo, Japan. *Procedia in Social and Behavioral Science* **21**, pp. 72-379).

Kolvoord, R. (2012). Integrating Geospatial Technologies and Secondary Student Projects: The Geospatial Semester. *Didactica Geografica* **13,** pp. 57-67.

Wilkerson, E., Nathaniel G. Meadow, Robert A. Kolvoord, Annie Senior, Eleanor S. Tushman, and David H. Uttal (2012). **Expanding spatial thinking via geospatial technologies within project-based curricula**. *Cognitive Processing* 08/2012; 13:S33-S33.

Kolvoord, R. and D. Edelson, Editors (2013). Investigating Your World with My World GIS. Published online by the National Geographic Society (Washington, DC). www.natgeoed.org/MyWorldGIS.

Keranen, K. and R. A. Kolvoord (2013). **Making Spatial Decisions With Remote Sensing**. ESRI Press, Redlands, CA.

Kolvoord, R., M. Charles and S. Purcell (2013**).** What Happens After the Professional Development: Case Studies on Implementing GIS in the Classroom**.** Chapter in **Learning Science Through the Innovative Use of Geospatial Technologies Designing Effective Learning Tools and Programs for K-16 Settings.** Barnett, Michael; MaKinster, James; Trautmann, Nancy (Eds.). Springer-Verlag.

Sinton, D., with S. Bednarz, P. Gershmehl, R. Kolvoord and D. Uttal (2013). **The People's Guide to Spatial Thinking**. National Council for Geographic Education, Washington, DC.

Baker,T, Battersby, S, Bednarz, S., Bodzin, A., Kolvoord, B., Moore,S., Sinton, D., and D. Uttal (2015). A Research Agenda for Geospatial Technologies and Learning. *Journal of Geography*, 114(3), pp. 118-130.

Keranen, K. and R. A. Kolvoord (2015). **Making Spatial Decisions With Lidar**. ESRI Press, Redlands, CA.

Kolvoord, R.A., Puffenbarger, R., McGhee, R., Miller, R., Overway, K., Phillips, K., Ryan, L., Sowers, J., and Brown, J. (2016). Bridging the Valley: Recruiting and Retaining STEM Majors. *Journal of STEM Education*, Vol 17(4), pp. 8-18.

Charles, M., Kolvoord, R.A. (2016) Geospatial Semester: Developing Students' 21st Century Thinking Skills with GIS: A Three Year Study. *Pyrex Journal of Educational Research and Reviews*, Vol 2 (6) pp. 67-78 December, 2016.

Keranen, K. and R. A. Kolvoord (2017). **Making Spatial Decisions With ArcGIS Pro**. ESRI Press, Redlands, CA.

Kolvoord, R.A., K. Keranen and P. Rittenhouse (2017). Applications of Location-Based Services and Mobile Technologies in K-12 Classrooms. *International Journal of Geo-Information 6*(7), 209; doi:10.3390/ijgi6070209

Kolvoord, B., K. Keranen and S. Rittenhouse (2019). The Geospatial Semester: Concurrent Enrollment in Geospatial Technologies. *Journal of Geography*, 118 (1), pp. 3-10; DOI: 10.1080/00221341.2018.1483961.

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Keranen, K. and Kolvoord, R. (2019). Light Detection and Ranging (LiDAR). *The Geographic Information Science & Technology Body of Knowledge* (4th Quarter 2019 Edition), John P. Wilson (ed.). doi: 10.22224/gistbok/2019.4.17

James, K., McGee, S., Uttal, D., & Kolvoord, B. (2020). Design-based research in GIS-infused disciplinary courses: Toward a design framework. In Gresalfi, M. and Horn, I. S. (Eds.). *The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 2* (pp. 1111-1117). Nashville, Tennessee: International Society of the Learning Sciences.

Peterson, Emily Grossnickle, Adam B. Weinberger, David H. Uttal, Bob Kolvoord, and Adam Green (2020). Spatial Activity Participation in Childhood and Adolescence: Consistency and Relations to Spatial Thinking in Adolescence. *Cognitive Research: Principles and Implications*, **5**, 43. doi:10.1186/s41235-020-00239-0.

Peterson, Emily Grossnickle, David H. Uttal, Bob Kolvoord and Adam Green (2020). High School Students' Experiences with Geographic Information Systems and Factors Predicting Enrollment in the Geospatial Semester. *Journal of Geography*, in press. https://doi.org/10.1080/00221341.2020.1824009

Kolvoord, Bob (2020). Fostering Spatial Thinking Skills for Future Citizens to Support Sustainable Development. Proceedings of the 2019 World Conference on Science Literary. *Cultures of Science*, in press. https://doi.org/10.1177/20966083211024714

Kolvoord, R. (2021). Evolution of Students' Spatial Skills. Chapter in GIS for Science, Vol. 3, edited by Dawn J. Wright and Christian Harder, pp 158-167. ESRI Press, Redlands, CA.

Cortes, R. A., Colaizzi, G. A., Dyke, E. L., Peterson, E. G., Walker, D. L., Kolvoord, R. A., Uttal, D. H., & Green, A. E. (2022). Individual Differences in Parietal and Premotor Activity During Spatial Cognition Predict Figural Creativity. Creativity Research Journal, 1–10. https://doi.org/10.1080/10400419.2022.2049532

Cortes, Robert A., Emily G. Peterson, David J. M. Kraemer, Robert A. Kolvoord, David H. Uttal, Nhi Dinh, Adam B. Weinberger, et al. 2022. "Transfer from Spatial Education to Verbal Reasoning and Prediction of Transfer from Learning-Related Neural Change." Science Advances 8 (32): eabo3555. https://doi.org/10.1126/sciadv.abo3555.

Invited Presentations & Workshops

Kolvoord, R.A. (1990). The Physics of Planetary Rings. Invited Seminar at the University of Wisconsin-Eau Claire, Eau Claire, WI.

Kolvoord, R.A. (1990). The Physics of Planetary Rings. Invited Seminar at the University of Virginia, Charlottesville, VA.

Kolvoord, R.A. (1991). Building Planets. Invited Seminar at the University of Wisconsin-Eau Claire, Eau Claire, WI.

Kolvoord, R.A. (1992). Putting the Science Back in Science Education. Invited Seminar at the University of Wisconsin-Eau Claire, Eau Claire, WI.

Kolvoord, R.A. (1992). Differing Formulations of Dynamical Friction. Invited Presentation at the Planetesimal Dynamics Workshop, Institute for Theoretical Physics, Univ. of California - Santa Barbara, CA.

Kolvoord, R.A. (1993). Image Processing for Teaching. Invited Seminar at James Madison University, Harrisonburg, VA.

Kolvoord, R.A., R.G. Strom, and R. Greenberg (1993). The Image Processing for Teaching Project: Applications to Research Invited Presentation at the 1993 Summer Meeting of the American Association of Physics Teachers, Boise, ID.

Kolvoord, R.A., and J. Morrow (1993). The Image Processing for Teaching Project: Physics and Images. Invited Presentation at the 1993 Summer Meeting of the American Association of Physics Teachers, Boise, ID.

Kolvoord, R.A. (1993). The Image Processing for Teaching Project: Applications to the Physics Classroom. Invited Presentation at Heidelberg College, Tiffin, OH.

Kolvoord, R.A. (1993). University Labs and Pre-College Classrooms: How Should They Be Similar and Why?. Invited presentation at the Lunar and Planetary Laboratory, University of Arizona. Tucson, AZ.

Kolvoord, R.A., and D. Warren (1994). Image Processing for Teaching: Science Applications. Invited Presentation at the Tucson Teacher Conference, Tucson, AZ.

Kolvoord, R.A. (1994). Image Processing for Teaching: Math Applications. Invited Presentation at the Tucson Teacher Conference, Tucson, AZ.

Kolvoord, R.A. and M. Magisos (1994). The Hands-On Image Processing Project. Invited Presentation at the Tucson Technology Fair, Tucson, AZ.

Kolvoord, R.A. (1994). Image Processing for Teaching: Applications to Technological Education. Invited Presentation at New Hampshire Technical College, Stratham, NH.

Kolvoord, R.A. (1994). Actively Using Technology in the Classroom: Image Processing for Teaching. Invited Presentation at MACWORLD, Boston, MA.
Kolvoord, R.A. (1994). Image Processing for Teaching: Programs that Work Invited Presentation at the Jet Propulsion Laboratory Symposium on Mars Pathfinder Education. Pasadena, CA.

Kolvoord, R.A. (1994). Alternative Career Paths with a Physics Degree. Invited Colloquium at the University of Virginia, Charlottesville, VA.

Kolvoord, R.A. (1994). Beyond Digital Video: Image Processing Applications for Physics. Invited Presentation at the Virginia Instructors of Physics Fall Meeting, Charlottesville, VA.

Kolvoord, R.A. (1994). Technology in Service of Learning. Invited Colloquium at James Madison University, Harrisonburg, VA.

Kolvoord, R.A. (1995). Actively Using Technology in the Classroom: Image Processing for Teaching. Invited Presentation at MACWORLD, San Francisco, CA

Kolvoord, R.A. (1995). Actively Using Technology to Learn Science: Image Processing for Teaching. Invited Presentation at the Tucson Technology Fair, Tucson, AZ.

Magisos, M. and R. A. Kolvoord (1995). Actively Using Technology to Learn Science: Image Processing for Teaching. Invited Presentation to the Pima Community College Deans of Instruction, Tucson, AZ.

Kolvoord, R.A. (1995). Actively Using Technology to Learn Science and Math: Image Processing for Teaching. Invited Colloquium at the University of North Carolina-Greensboro, Greensboro, NC

Kolvoord, R.A. (1995). Image Processing for Teaching. Invited Keynote address to the National Congress on Aviation and Space Education, San Diego, CA.

Kolvoord, R.A. (1995). Technology and Physics Curricula. Invited Colloquium for the Physics Dept., James Madison University, Harrisonburg, VA.

Kolvoord, R.A. (1995). Visualizing Science and Math. Two Invited Colloquia for the Integrated Science and Technology Program, James Madison University, Harrisonburg, VA.

Kolvoord, R.A. (1995). Hands-On Image Processing. Invited presentation at the Annenberg/CPB Multimedia Producers Meeting, Washington, DC.

Kolvoord, R.A. (1996). Image Processing and Motion Analysis. Invited presentation at the American Association of Physics Teachers Winter Meeting, Reno, NV.

Kolvoord, R.A. (1996). Invited speaker on Technology in Education at the National Governor's Association Education Summit, Palisades, NY.

Kolvoord, R.A. (1996). Image Processing Applications for Technological Education. Two invited presentations at the St. Louis Community College, St. Louis, MO.

Kolvoord, R.A. (1995). Image Processing Applications for Aviation and Space Education. Keynote address to the National Congress on Aviation and Space Education, Little Rock, AR.

Kolvoord, R.A. (1996). Using Technology to Learn Math and Science. Invited Colloquium, Cornell University, Ithaca, NY.

Kolvoord, R,A, (1996). Guest lecturer, Mind Extension University course on multimedia.

Kolvoord, R. A. and M. Magisos (1996). Hands-on Image Processing for Educators, Invited Demonstration, Image Processing for Teaching Conference, Orlando, FL.

Kolvoord, R.A., A. Van Dyke and J. Winebrake (1996). Data Visualization in the Integrated Science and Technology Program. Spotswood High School, Harrisonburg, VA.

Kolvoord, R.A. (1996). The Image Processing for Teaching Project: Astronomy and Images. Invited Presentation at the 1996 Summer Meeting of the American Association of Physics Teachers, College Park, MD.

Kolvoord, R.A. (1996). Get the Picture: Using Images in Education. Two invited workshops for the Technical Education Research Corporation's Model Schools Project, Endicott College, Beverly Farms, MA.

Kolvoord, R.A. (1996). HIP for Educators - the Nuts and Bolts. Invited presentation at the annual Image Processing for Teaching conference, Orlando, FL.

Kolvoord, R.A. (1997). Image Processing application for technological education. An invited workshop at the Consortium for Industry-Education Collaboration annual meeting, Tampa, FL.

Kolvoord, R.A. (1997). Unraveling the mysteries of Saturn's F Ring. Invited Colloquium for the Physics Dept., James Madison University, Harrisonburg, VA.

Kolvoord, R.A. (1997). Integrating Science and Technology at James Madison University. Invited case study session for the National Research Council/American Association of Higher Education special session on innovative applications of educational technology, Washington, DC.

Kolvoord, R.A. and M. Magisos (1997). Image Analysis Applications for Advanced Technical Education. Invited Seminar at the National Science Foundation, Arlington, VA.

Kolvoord, R.A. (1997). Imaging Applications for the Physics Classroom. James Gerhart Lecture at the Science of Imaging Conference, Pacific Coast Association of Physics Teachers, Portland, OR.

Kolvoord, R.A. (1997). Invited Demonstrator at the Eisenhower National Clearinghouse Meeting on Science and Math Reform, Alexandria, VA.

Kolvoord, R,A, (1997). Image Processing: Exploration and Discovery in Math and Science. Invited Workshop at Shenandoah University Teacher Training Institute. Winchester, VA.

Kolvoord, R,A, (1997). Conference Co-Chair for the National Imaging Technology Conference. Rochester, MN.

Kolvoord, R.A. (1997). Web Use in the Classroom – Pitfalls and Possibilities. Invited Session for the JMU Center for Multimedia What's Up Series.

Kolvoord, R.A., C.E. Letsky, and M. Kraus (1998). The Virtual Valley CD-ROM – A Tourism Tool. Invited Presentation to the Rockingham County Board of Supervisors, Harrisonburg, VA>

Kolvoord, R.A. (1998). Image Processing Applications for Math and Science. Invited Workshop at the Northwest Consortium for Computer Education Annual Meeting, Spokane, WA.

Kolvoord, R.A. (1998).Don't Avoid Your Eyes, Visualize!. Invited Featured Speaker at the Northwest Consortium for Computer Education Annual Meeting, Spokane, WA.

Kolvoord, R.A. (1998). Scientific Visualization Applications for Math and Science. Invited In-Service Workshop for the Winchester City Public Schools, Winchester, VA.

Kolvoord, R.A. (1998). Integrated Science and Technology at James Madison University. Invited Case Study at the Project Kaleidoscope Workshop on Interdisciplinary Programs, Bozeman, MT.

Kolvoord, R,A, (1998). Conference Co-Chair for the National Imaging Technology in Education Conference, Phoenix, AZ.

Kolvoord, R,A, and P. Johnson (1998). Image Processing in the College Classroom. Invited Session at the National Imaging Technology Conference, Phoenix, AZ.

Kolvoord, R.A. (1998). Integrating Science and Technology – An Innovative Approach to an Undergraduate Major. Invited Colloquium at the University of Wisconsin, Eau Claire, Eau Claire, WI.

Kolvoord, R.A. (1999). Two invited workshops at the Teaching Inquiry Learning with Technology Conference, Roanoke, VA.

Kolvoord, R.A. (1999). New Tools for Science and Math. Keynote address at the National Teacher Training Institute meeting, Harrisonburg, VA.

Kolvoord, R.A. (1999). Technologies for Teaching. Keynote speaker at the Lynchburg Foundation Workshop on Technology. Sweetbriar College, Lynchburg, VA.

Kolvoord, R.A. (1999). Support and Assessment Strategies for Using Technology in Teaching. Plenary speaker for the Project Kaleidoscope Workshop on Integrating Technology and Interdisciplinary Courses, JMU, Harrisonburg, VA.

Kolvoord, R.A. (1999). Workshop on Data Visualization for Harrisonburg City Public Schools, Harrisonburg, VA.

Kolvoord, R.A. (1999). Get the Picture – Data Visualization Tools for Math and Science. Keynote speaker at the Williamson County Schools Technology Conference, Nashville, TN.

Kolvoord, R.A. (1999). Seminar on Web-based Training to Shenandoah Valley Chapter of ASTD, Waynesboro, VA.

Kolvoord, R.A. (1999). Designing Integrated Curricula in Science and Math. Invited Seminar at Emory University, Atlanta, GA.

Kolvoord, R.A. (2000). Data Visualization Tools for the Classroom. Invited Workshop at the Teaching Inquiry Learning with Technology Conference, Roanoke, VA.

Kolvoord, R.A. (2000). Image Processing Applications for Biotechnology. Invited Workshop at Biotechnology 2001, Blacksburg, VA.

Kolvoord, R.A. (2000). Issues and Implications for Educational Technology. Invited Keynote for Shenandoah Valley Technology Council Summer Administrator's Workshop. Harrisonburg, VA.

Boyd, T., J. Narum and R. Kolvoord (2000). Digital Libraries – What's New and What's Coming. Invited Panel at AAC&U Annual Meeting, New Orleans, LA.

Kolvoord, R.A. (2001). Issues in Educational Technology. Invited Keynote at Loras College Campus Symposium on Teaching and Learning with Technology. Dubuque, IA.

Kolvoord, R,A, (2001). Data Visualization. Invited Workshop at Western State College. Gunnison, CO

Kolvoord, R.A. (2001). Using Real-Time Datasets in the Classroom. Invited Speaker and Session Organizer at Digital Library for Earth Systems Education Annual Meeting. Flagstaff, AZ.

Kolvoord, R.A. (2002). Organizer for Educational Technology Session at 2002 Project Kaleidoscope Summer Institute. Williamsburg, VA.

Kolvoord, R.A. (2002). Data Visualization Applications (2 sessions). Invited Presenter for Jefferson/Overseas Technology for Institute for American Sponsored Overseas Schools. Fairfax, VA.

Kolvoord, R.A. (2002). Instructional Design for e-Learning. Invited Workshop for Loudon and Arlington County Schools. Leesburg, VA.

Kolvoord. R.A. (2002). Workshop and Co-Teaching on Data Visualization (4 days). Invited Presenter for North Warren, NY Public Schools. North Warren, NY.

Kolvoord, R.A. (2002). Workshop on Discrete Mathematics. Invited Participant. United States Military Academy, West Point, NY.

Kolvoord, R.A. (2002). Organizer for Educational Technology Leadership Session at 2002 Project Kaleidoscope Faculty for the 21st Century Annual Meeting. Washington, DC.

Kolvoord. R.A. (2003). Workshop and Co-Teaching on Data Visualization (4 days). Invited Presenter for North Warren, NY Public Schools. North Warren, NY.

Klevickis, C. and R. Kolvoord (2003). Presentation on JMU IDLS Science Core. Invited Presenter for Arizona Systemic Reform Conference. Flagstaff, AZ.

Kolvoord, R,A, (2003). GIS Applications. Invited Workshop for Nashville Astrobiology Workhsop. Nashville, TN.

Kolvoord, R.A. (2003). Data Visualization in Education. Invited Participant to Gordon Conference. Oxford, England.

Kolvoord, R.A. (2003). Connections with Business and Industry: ISAT Connections. Invited Presenter at Project Kaleidoscope Workshop on Motivating Students to Pursue Careers in STEM Fields. Oberlin, OH.

Lovell, S.. D. Carrothers and R. Kolvoord (2003). IDLS Program at JMU. Invited Plenary Speaker at Virginia Middle School Education Conference. Harrisonburg, VA.

Kolvoord, R.A. (2003). Invited Participant in Virginia Department of Education Geospatial Planning Retreat. Richmond, VA.

Kolvoord, R.A. (2004). Invited GIS workshops for teachers and students at Collegul Nacional Mihai Viteazul, Bucharest, Romania.

Kolvoord, R.A. (2004). Invited GIS workshops to science and social studies teachers in Loudon County, Virginia.

Kolvoord, R.A. (2004). Invited presentation on Data Visualization in Education to JMU Content Academy, Harrisonburg, VA.

Kolvoord, R.A. (2004). Invited panelist on Trends in Research on GIS in Education at the ESRI Education Users' Conference, San Diego, CA.

Kolvoord, R.A. (2004). From Brainstorm to Finished Product: Stages of Student Research at the Fall Meeting of the Virginia Governors' School Directors. Roanoke, VA.

Klevickis, C., R. Kolvoord and M. Handley (2004). Mosier Fellowship Lecture. James Madison University, Harrisonburg, VA.

Kolvoord, R.A. (2004). Featured Session on Data Visualization, National Science Teachers Association Regional Meeting, Richmond, VA.

Kolvoord, R.A. and K. Keranen (2005). Invited Workshop on GIS Applications to Oceanography. Center for Image Processing in Education Ocean Explorers Workshop, Ventura, CA.

Kolvoord, R.A. (2005). Invited Panelist on Research Guide for NCSSSMST Students. NCSSSMST Annual Meeting, St. Louis, MO.

Kolvoord, R.A.(2005). Keynote Speaker for National Association of Geoscience Teachers,
Eastern Regional Meeting, Radford University, Radford, VA.

Kolvoord, R.A. (2005). Data Visualization. Invited Presentation at JMU Summer Content Academy, James Madison University, Harrisonburg, VA.

Kolvoord, R.A. (2005). Invited Participant to the Gordon Conference on Visualization in Science Education, Oxford University, Oxford, England.

Kolvoord, R.A. (2006). Invited Participant in MyWorld GIS Software Developer's Worksho, Northwestern University, Evanston, IL.

Kolvoord, R.A. (2006). Invited Participant in the Visualization and Science Education Conference at the National Science Foundation, Arlington, VA.

Kolvoord, R.A. (2006). Invited Presenter at the Project Kaleidoscope Faculty for the 21st Century Annual Meeting, Harper College, Chicago, IL.

Kolvoord, R.A. (2006). Invited Presentation (w/J. Miles) on the Integrated Science and Technology Program to the leadership of the University of Malta, Msida Malta

Kolvoord, R.A. (2006). Invited Participant in the Geospatial Technology Course Design Meeting, Virginia Department of Education, Richmond, Virginia.

Kolvoord, R.A. (2007). Invited Participant in Virginia K-12 Engineering Symposium, sponsored by Governor Kaine's Office, Hampton, VA.

Kolvoord, R.A. (2007). Invited Participant to the Gordon Conference on Visualization in Science Education, Bryant College, Providence, RI.

Charles, M., K. L. Peck, C. Lemke, R. Kolvoord, G Knezek, and T. Nofar (2008). Panel – SIGTE Forum: Assessing 21st Century Skills –Next Steps – at the National Educational Computing Conference, San Antonio, TX.

Kolvoord, R.A., K. Keranen, A. Palmer, R. Palmer, E. Napoleon, and E. Brook (2008). Invited Author Panel at the ESRI Education User's Conference, San Diego, CA.
Kolvoord, R.A (2009). GIS Applications in K-12 Curriculum. Invited Workshop at the Virginia Society for Technology in Education Annual Meeting, Virginia Beach, VA.

Kolvoord, R.A. (2009). Geospatial Semester – GIS and Project-Based Curricula. Invited Colloquium for the MS GIS Program at the University of Redlands, Redlands, CA

Kolvoord, R.A. (2009). Embedding GIS-Based Curriculum in K-12. Invited Colloquium for the College of Education at the University of Redlands, Redlands, CA

Kolvoord, R.A. (2009). Integrating GIS into K-12 Education: Curricula and Challenges. Presentation at the 2009 NC GIS Conference, Raleigh, NC.

Whitaker, D., A, Carroll, B. Kolvoord, E. Walker, and B. Welsh (2009). Integrating GIS into K-12 Education. Panel Presentation at the 2009 NC GIS Conference, Raleigh, NC.

Kolvoord, R.A. (2009). Invited Participant to the Gordon Conference on Visualization in Science Education, Oxford University, Oxford, England.

Kolvoord, R.A. (2009). The Geospatial Semester. Invited Presentation at Loudoun County GIS Day, Leesburg, VA

Kolvoord, R.A. (2009). Invited Facilitator for Governor's Conference on STEM Education, Virginia Tech, Blacksburg, VA

Kolvoord, R.A. (2010). Mapping a Difference in the GoogleSpatial World. Invited Colloquium for JMU's Institute for Visual Studies. Harrisonburg, VA

Krimmer, M., J. Allen., R. Kolvoord and S. DiMaria (2010). Geospatial Technology in Community Colleges. Panel Presentation at the Association of American Geographers Annual Meeting, Washington, DC.

Kolvoord, R.A. (2010). Invited Panel Presentation at the GTEVCC Workshop, Virgnia Tech, Blacksburg, VA.

Kolvoord, R.A. (2010). The Future of Educational Technology. Invited Presentation at the Roanoke Valley Governor's School, Roanoke, VA.

Kolvoord, R.A. (2010). Invited Workshop on GIS in Science Education. Loudoun Academy of Science (Loudoun County STEM Magnet School), Sterling, VA.

Kolvoord, R.A. (2011). Invited Presentation on GIS in Virginia. ESRI Federal Users Conference, Washington, DC.

Kolvoord, R. A., (2011). Workshop for GTEVCC Grant, Virginia Tech, Blacksburg, VA, "Panel on GIS in K-16 Education".

Kolvoord, R.A. (2011). Workshop for Loudoun Academy of Science, Ashburn, VA. "Introduction to GIS".

Kolvoord, R.A. (2011). Workshop for Roanoke Valley Governor's School, Roanoke, VA, "The Future of Educational Technology".

Invited Discussion Leader – 2011 Gordon Conference on Visualization in Science and Education, Bryant College, Providence, RI.

Kolvoord, R.A. (2012). Disruptive Innovation in Higher Education, Keynote Address to MASS 2012 Conference, Shanghai, China.

Kolvoord, R.A. (2012). Mapping A Difference: How Geospatial Technology Connects Local to Global. Invited Talk at TedX Ashburn, Ashburn, VA.

Kolvoord, R.A. (2012). Invited GIS workshop for teachers and students and SOS Hermann Gmeiner School, Tema, Ghana.

Invited Discussion Leader – 2013 Gordon Conference on Visualization in Science and Education, Bryant College, Providence, RI.

Invited Participant, Research on Geospatial Thinking and Learning Meeting, Austin, TX, Nov. 2013.

GIS workshop at Pacific University (Forest Grove OR) to inaugurate their offering of the Geospatial Semester, August 2014.

Presentation on Gordon Conference in Visualization and Education at the A2RU (Association for the Arts in Research Universities) Annual Meeting, Ames, IA, Nov. 2014.

National Council on Geographic Education Annual Meeting, Memphis, TN, July 2014

Presentation on the Impact of GIS on Students' Spatial Thinking Skills: Discourse. ESRI Education Users Conference (ESRI International Users Conference) San Diego, July 2014

Workshop on Making Spatial Decisions with Remote Sensing, ESRI Education Users Conference (ESRI International Users Conference) San Diego, July 2014

Conference Chair (Elected) – 2015 Gordon Conference on Visualization in Science and Education, Bates College, Lewiston, ME.

Presentation on the Impact of Geospatial Technology on Students' Spatial Thinking Skills. AAAS Annual Meeting, San Jose, CA, Jan 2015

Panel Discussion on Assessing the Impact of GIS on Students' Spatial Thinking Skills. ESRI Education Users Conference (ESRI International Users Conference) San Diego, July 2015

Mapping a Difference: The Power of Geospatial Visualization, Invited Talk as part of Amazing Technologies and Capabilities that Contribute to STEM Session at the American Geophysical Union Annual Meeting, San Francisco, December 2015

Organized and moderated panel on Interdisciplinary Engineering Programs at the American Association of Colleges and Universities Annual Meeting, Washington, DC, January 2016

Invited Workshop on Online Mapping for VSTE Brainstorm Conference, Harrisonburg, VA, April 2016

Discussant, Panel on Science Learning, Education and Cognitive Neuroscience. 2016 International Mind, Brain and Education Society Meeting, Toronto, Ontario.

Uttal, D., R. Kolvoord and A. Green (2016). Improving spatial thinking and problem-solving through the use of Geographic Information Systems (GIS). Invited talk at the 2016 International Mind, Brain and Education Society Meeting, Toronto, Ontario.

Invited Keynote Speaker – 2017 Harrisonburg Governors STEM Academy Showcase, Harrisonburg, VA.

Invited Speaker – 2017 Gordon Conference on Visualization in Science and Education, Bates College, Lewiston, ME.

Invited Talk on GIS in High School: The Geospatial Semester, Thammasat University, Rangsit, Thailand, June 2018.

Invited workshops on Geospatial Technology in the Classroom (w/Paul Rittenhouse, Kathryn Keranen and Katelyn Chadwick), Chicago Public Schools, Chicago, IL, June and August, 2018.

Invited Keynote Speaker – 2019 Spatial Symposium, University of Redlands, Redlands, CA, March 2019.

Invited Research Seminar – Spatial Cognition and the Geospatial Semester, ESRI, Redlands, CA, March 2019.

Invited Seminar – Transdisciplinary engineering and applied science education: building programs that work**.** Wroclaw University of Environmental and Life Sciences, Wroclaw, Poland, June 2019.

Invited talk – Transdisciplinary Education: A New Paradigm to Meet the Needs of a Changing World. Kosovo Leadership Foundation Conference, Pristina, Kosovo, June 2019.

Invited Seminar – Transdisciplinary engineering and applied science education: building programs that work**.** Civil Engineering Faculty, Warsaw University of Technology, Warsaw, Poland, June 2019.

Invited Research Seminars – The Power of Curiosity: Preparing Students for Futures We Can't Yet Imagine. Beijing Normal University, Beijing, China, July 2019.

Invited workshops on Geospatial Technology in the Classroom (w/Paul Rittenhouse, and Kathryn Keranen), Chicago Public Schools, Chicago, IL, June and August, 2019.

Invited session on Ecosystems of Learning at the Learning Spaces Collaboratory National Colloquium (w/Laura Malinin, Henry Way, and Howard Wertheimer), Kansas City, MO, October 2019. I also served on the organizing committee for this event.

Invited Panelist at the Symposium on Imagining the Future of Undergraduate STEM Education, National Academies of Science, Engineering and Medicine, virtual meeting, November 2020.

Invited Keynote Address - Transdisciplinary engineering and applied science education: building programs that work. Education, Engineering Education and Instruction Technology Conference (EEEITC 2021), Qatar University, February 2021.

Invited Webinar on the Geospatial Semester. Presentation to T3G, hosted by ESRI, March, 2021.

Invited Panel Participant (R. Kolvoord, A. Broscheid, K. Crawford. C. Liu, C. Nash)– Back to Normal, James Madison University Center for Faculty Innovation (CFI), August, 2021.

Invited Panel Organizer (R. Kolvoord, G. Fernandes, C. Morett, H. Way) – Topophilia: The Importance of Place, Learning Spaces Collaboratory, August, 2021.

Invited Panelist, Efforts to Revitalize Geography in Higher Education Panel, American Association of Geographers Annual Meeting (Virtual), February 2022.

Presentations and Abstracts

Kolvoord, R.A. and J.A. Burns (1986). The Effect of an Embedded Satellite on Narrow Rings using a Perturbation Approach. BAAS **18**, 771.

Kolvoord, R.A. and J.A. Burns (1987). The Effect of Embedded and Shepherding Satellites on a Narrow Ring: a Numerical Simulation. BAAS **19**, 891.

Kolvoord, R.A. and J.A. Burns (1988). Numerical Simulations of Narrow Planetary Rings. BAAS **20,** 859.

Kolvoord, R.A. and J.A. Burns (1989). Azimuthal Periodicities in Saturn's F Ring. BAAS **21**, 929-930.

Burns, J.A. and R.A. Kolvoord (1989). Periodicities in Rings: Keeler Gap and Saturn's F Ring. BAAS **21**, 730.

Burns, J.A. , R.A. Kolvoord, D.P. Hamilton, and J.N. Cuzzi (1989). Theoretical/ Observational Constraints on Particles Co-orbiting with Inner Saturnian Satellites. BAAS **21**, 730.

Kolvoord, R.A. and J.A. Burns (1990). Collisional Modeling of Saturn's F Ring. BAAS **22**, 1042.

Greeley R., Belton M., Bolef L., Carr M. H., Chapman C., Davies M., Doose L., Fanale F., Gaddis L., Greenberg R., Head J., Hoffmann H., Jaumann R., Johnson T., Klaasen K., Kolvoord R., McEwen A., Murchie S., Neukum G., Oberst J., Pieters C., Pilcher C., Plutchak J., Robinson M., Sullivan R., Sunshine J., Veverka J. (1991). Lunar Maria and Related Deposits: Preliminary Galileo Imaging Results. Lunar and Planetary Sci. **22**, 491-492.

Head J. W., Belton M., Carr M. H., Chapman C., Davies M., Fanale F., Fischer E., Greeley R., Greenberg R., Kolvoord R., Doose L., Helfenstein P., Hoffmann H., Jaumann R., Johnson T., Klaasen K., McEwen A., Becker T., Murchie S., Neukum G., Oberst J., Pieters C., Pilcher C., Plutchak J., Robinson M., Sullivan R., Sunshine J., Veverka J. (1991). Orientale and South Pole-Aitken Basins: Preliminary Galileo Imaging Results. Lunar and Planetary Sci. **22**, 545-546.

Kolvoord, R.A. (1991). A Reexamination of Early Numerical Models of Planetary Accretion. Lunar and Planetary Sci. **22**, 735-736.

Kolvoord, R.A. and J.A. Burns (1991). Three-Dimensional Perturbations in Saturn's F Ring. BAAS **23**, 1180.

Kolvoord, R.A. and L.E. Dahlman (1991). Image Processing for Teaching. Presentation at the Vancouver Regional Meeting of the National Science Teachers' Association. Vancouver, BC.

Kolvoord, R.A. and R.A. Ditto (1991). Image Processing for Teaching. Presentation at the Glendale District-Wide Inservice Day. Glendale, AZ.

Kolvoord, R.A. and R. Greenberg (1991). Image Processing for Teaching. Presentation at the ``Tech'' Science Museum. San Jose, CA.

Kolvoord, R.A. and R. Greenberg (1992). Numerical Simulations of Proto-Neptunian Formation. Presented at the ***Neptune*** meeting.

Kolvoord, R.A. and R. Greenberg (1992). Incipient Runaway Growth: Critical Physical Processes. Lunar and Planetary Sci. **23**, 711-712.

Strom, R.G., R.J. Greenberg, M. Magisos, R.A. Kolvoord and S. Croft (1992). Image Processing for Teaching and the Center for Image Processing in Education. Lunar and Planetary Sci. **23**.

Lockwood, J., R. G. Strom, R.J. Greenberg, M. Magisos, R.A. Kolvoord and S. Croft (1992). Image Processing for Teaching: A High School Teacher's Perspective. Lunar and Planetary Sci. **23**.

Greenberg, R. and R.A. Kolvoord (1992). Image Processing for Teaching. Presentation at the Arizona Science Teachers' Mini-Convention. Tucson, AZ.

Kolvoord, R.A. (1992). The Dynamics of Narrow Planetary Rings: What can the F Ring Tell us? Eos **73**, 177.

Kolvoord, R.A. and L.E. Dahlman (1992). Image Processing for Teaching. Presentation at the Microcomputers in Education Conference. Tempe, AZ.

Kolvoord, R.A., R.G. Strom, R.J. Greenberg, S. Croft, and M. Magisos (1992). Image Processing for Teaching. Presentation at the Southwestern and Rocky Mountain Division of AAAS Meeting. Tucson, AZ.

Kolvoord, R.A. and R. Greenberg (1992). Quantum Accretion of Planetesimals. BAAS **24**, 982.

Greenberg, R., M.C. Nolan, W.F. Bottke, R.A. Kolvoord, J. Veverka and the Galileo Imaging Team, M. Belton, Team Leader (1992). Collisional and Dynamical Evolution of Gaspra. BAAS **24**, 933.

Kolvoord, R.A. (1992). Dissemination of the Image Processing for Teaching Project. Presentation at the National Science Supervisors Association. San Diego, CA.

Kolvoord, R.A. (1992). The Scope and Sequence of the Image Processing for Teaching Project. Presentation at the National Science Teachers Association's Restructuring Secondary Science Meeting. La Jolla, CA.

Kolvoord, R.A. and R. Greenberg (1992). Quantum Accretion and Seeding Growth of Runaway Planetesimals. Presentation at Planetary Systems: Formation, Evolution and Detection. Jet Propulsion Laboratory, Pasadena, CA.

Kolvoord, R.A., and W. Schnase (1993). The Image Processing for Teaching Project: Applications to the Physics Classroom. Presentation at the Winter Meeting of the American Association of Physics Teachers, New Orleans, LA.

Kolvoord, R.A., and M. Magisos (1993). Image Processing for Teaching: Innovative Distance Education. Presentation at the Society of Technology and Teacher Education 1993 Annual Meeting, San Diego, CA.

Kolvoord, R.A., and M. Ellison (1993). Image Processing for Teaching: Exploration and Discovery in Science and Mathematics. Presentation at the North Coast Computer Educators 1993 Annual Meeting, Portland, OR.

Greenberg, R., M.C. Nolan, W.F. Bottke, and R.A. Kolvoord (1993). Collisional and Dynamical History of Gaspra. Lunar and Planetary Sci. **24**, 719-720.

Kolvoord, R.A. and D. Wessel (1993). The Image Processing for Teaching Project Presentation at the 1993 Annual Meeting of M.I.C.C.A., Baltimore, MD.

Nolan, M.C., W.F. Bottke, R.A. Kolvoord, and R. Greenberg (1993). Numerical simulation of impacts on small asteroids: application to 951 Gaspra. Submitted to Asteroids, Comets and Meteorites Conference (ACM '93).

Kolvoord, R.A., R.G. Strom, R.J. Greenberg, S. Croft, and M. Magisos (1993). The Image Processing for Teaching Project. Presentation at the National Educational Computing Conference, Orlando, FL.

Hardesty, S., R. A. Kolvoord, R.J. Greenberg, M. Magisos, and R.G. Strom (1993). Image Processing for Teaching: A Teacher's Perspective. The Image Processing for Teaching Project. Presentation at the National Educational Computing Conference, Orlando, FL.

Kolvoord, R.A. and L. Kendall (1993). Image Processing for Teaching: Applications to Technology. Presentation at the Mesa Technology Fair, Mesa, AZ.

Kolvoord, R.A. and M. Magisos (1993). Image Processing for Teaching: Innovative Inservice Education. Presentation at the Denver Regional Meeting of the National Science Teachers' Association. Denver, CO.

Greenberg, R., M.C. Nolan, W.F. Bottke, R.A. Kolvoord, and P. Geissler (1993). Twice in a Lifetime: Effects of a Recent Major Impact on Gaspra. BAAS **25**, 1138-1139.

Kolvoord, R.A. and M.E. Parrott (1993). Image Processing for Teaching: Applications to the Classroom. Presentation at the Louisville Regional Meeting of the National Science Teachers' Association. Louisville, KY.

Schnase, W., R. A. Kolvoord, and J. Morrow (1994). The Image Processing for Teaching Project: Making It Happen in the Classroom. Presentation at the 1994 Winter Meeting of the American Association of Physics Teachers, San Diego, CA.

Kolvoord, R.A., J. Morrow, and W. Schnase (1994). The Image Processing for Teaching Project: Beyond Digital Video. Presentation at the 1994 Winter Meeting of the American Association of Physics Teachers, San Diego, CA.

Kolvoord, R.A. (1994). Image Processing for Teaching: Avenues to Discovery. Presentation at the Florida Education Technology Conference, Tampa, FL.

Ehrmann, S., M. Honey, and R. Kolvoord (1994). Reforming Math and Science Instruction: Intervention on a Large Scale. Panel Presentation at the Society for Technology and Teacher Education Annual Meeting, Washington, D.C.

Honey, M., R.A. Kolvoord, S. Roberts, and D.M. Kurland (1994). Using Technologies to Achieve Large-Scale Educational Reforms: A Discussion of Design, Development and Delivery Issues. Panel Presentation at the American Educational Research Association Annual Meeting, New Orleans, LA.

Kolvoord, R.A. (1994). Image Processing for Teaching: Exploration and Discovery in the Classroom. Presentation at the Virginia Society for Technology in Education Conference, Wintergreen, VA.

Kolvoord, R.A. and M. Magisos (1994). The Hands-on Image Processing Project. Presentation at the ED-MEDIA Conference, Vancouver, BC.

Kolvoord, R.A. (1994). Actively Using Technology in the Classroom: Image Processing for Teaching Superhighways: The Educational Technology Journey Conference, Osage Beach, MO.

Kolvoord, R.A. and M. Magisos (1994). The Hands-on Image Processing Project. Presentation at the Minneapolis Regional Meeting of the National Science Teachers' Association. Minneapolis, MN..

Kolvoord, R.A. and M. Magisos (1994). Technology and Technological Education: Image Processing for Teaching. Presentation at the League for Innovation's Annual Technology Conference, Houston, TX.

Kolvoord, R.A. and D. Warren (1994). Actively Using Technology to Teach Biology: Image Processing for Teaching. Presentation at the National Association of Biology Teachers' Meeting, St. Louis, MO.

Greenberg, R., R. A. Kolvoord, and M. Magisos (1995). Exhibit on Image Processing for Teaching. National Science Foundation/Department of Education Invitational Conference, Washington, DC

Kolvoord, R.A. (1995). Actively Using Technology to Learn Science: Image Processing for Teaching. Presentation at the Regional Conference on Educational Technology, St. Louis, MO

Kolvoord, R.A. (1995). Actively Using Technology to Learn Science: Image Processing for Teaching. Presentation at the Consortium of Specialized Schools of Science, Math and Technology Annual Conference, Lynchburg, VA.

Kolvoord, R.A. (1995). Actively Using Technology to Learn Science and Math: Image Processing for Teaching. Presentation at the Satellites in Education Conference, West Chester, PA

Kolvoord, R.A., F. Collins, and T. Riley (1995). Hands-on Image Processing. Demonstration at the Satellites in Education Conference, West Chester, PA

Wessel, D., F. Collins, T. Riley, L.E. Dahlman, D. McGraw, and R. A. Kolvoord, (1995). Image Processing for Teaching: A Teacher's Perspective. Presentation at the National Science Teachers Association National Conference, Philadelphia, PA.

Kolvoord, R.A. and M. Magisos (1995). The Hands-on Image Processing Project. Presentation at the National Meeting of the National Science Teachers' Association. Philadelphia, PA.

Kolvoord, R.A. (1995). Technology and Technological Education: Image Processing for Teaching. Presentation at the International Technology Education Association's Annual Meeting, Nashville, TN

Kolvoord, R.A. (1995). Actively Using Technology to Learn Science and Math: Image Processing for Teaching. Presentation at the Virginia Society for Technology in Education, Wintergreen, VA

Kolvoord, R.A. (1995). Actively Using Technology to Learn Science and Math: Image Processing for Teaching. Two presentations at the Technology Innovations in Education Conference, Rapid City, SD

Kolvoord, R.A. (1995). Staff Development Using Technology. Participation in a panel session at the American Educational Research Association meeting, San Francisco, CA.

Kolvoord, R.A. (1995). Curriculum for your technology. Two curriculum workshops at the National Congress on Aviation and Space Education, San Diego, CA.

Kolvoord, R.A. and J.E. Morrow (1995). Digital Video and Physics Applications. Two workshops at the American Association of Physics Teachers Summer meeting, Spokane, WA.

Kolvoord, R.A. and L.E. Dahlman (1995). Image Processing for Teaching. Presentation at the National Science Teachers Association Regional Conference, Baltimore, MD.

Kolvoord, R.A. and M. Magisos (1995). The Hands-on Image Processing Project. Presentation at the Regional Meeting of the National Science Teachers' Association, Baltimore, MD.

Kolvoord, R.A. (1995). Image Processing for Teaching mini-workshops. Two workshops at the Henrico County Public School Technology Inservice, Richmond, VA.

Kolvoord, R.A., M. Deaton and C. Klevickis (1996). Integrated Science and Technology at James Madison University. Presentation at the National Consortium of Specialized Schools of Math, Science and Technology Workshop on Critical Thinking and Learning, Greencastle, IN.

Kolvoord, R.A. (1996). Integrated Science and Technology at James Madison University. Presentation at the Northern Virginia Technology in Education Consortium, Alexandria, VA.

Kolvoord, R.A. (1996). Image Processing Applications in Science and Math. Two presentations and a workshop at the Northern Virginia Technology in Education Consortium, Alexandria, VA.

Kolvoord, R.A. and M. Magisos (1996). The Hands-on Image Processing Project. Presentation at the National Meeting of the National Science Teachers' Association. St. Louis, MO.

Kolvoord, R.A. and M. Magisos (1996). The Hands-on Image Processing Project. Presentation at the National Educational Computing Conference, Minneapolis, MN.

Kolvoord, R.A. and M. Magisos (1996). Learning Image Processing with Computer-based Staff Development. Presentation at the National Science Teachers Association Regional Meeting, Atlanta, GA.

Kolvoord, R.A. (1996). Integrating Science and Technology at the College Level. Presentation at the National Science Teachers Association Regional Meeting, Atlanta, GA.

Kolvoord, R.A. and M. Magisos (1996). Learning Image Processing with Computer-based Staff Development. Presentation at the National Science Teachers Association Regional Meeting, Toronto, ON.

Kolvoord, R.A. (1996). Integrating Science and Technology at the College Level. Presentation at the National Science Teachers Association Regional Meeting, Toronto, ON.

Kolvoord, R.A. and J. Mulvaney (1996). Image Processing - A Classroom Perspective. Presentation at the Virginia Association of Science Teachers Meeting, Roanoke, VA.

Kolvoord, R.A. (1996). The Integrated Science and Technology Program at JMU. Presentation at the Virginia Association of Science Teachers Meeting, Roanoke, VA.

Kolvoord, R.A. (1996). Integrating Science and Technology at the College Level. Presentation at the NSTA Global Summit on Science Education, San Francisco, CA.

Kolvoord, R.A. and M. Magisos (1996). Learning Image Processing with Computer-based Staff Development. Presentation at the NSTA Global Summit on Science Education, San Francisco, CA.

Kolvoord, R.A. and R. Greenberg (1996). Actively Using Technology to Learn Science and Math: Image Processing for Teaching. Presentation at the NSTA Global Summit on Science Education, San Francisco, CA.

Kolvoord, R.A. (1997). Computer-Based Visualization Tools for Science and Math. Presentation at the Consortium of Specialized Schools of Science, Math and Technology Annual Conference, New Orleans, LA.

Kolvoord, R.A. (1997). Integrated Science and Technology at James Madison University, An Update. Presentation at the Consortium of Specialized Schools of Science, Math and Technology Annual Conference, New Orleans, LA.

Kolvoord, R.A. (1997). Integrated Science and Technology at James Madison University. Presentation at the Northern Virginia Technology in Education Consortium, Alexandria, VA.

Kolvoord, R.A. (1997). Image Processing Applications in Science and Math. Two presentations and a workshop at the Northern Virginia Technology in Education Consortium, Alexandria, VA.

Kolvoord, R.A. (1997). Image Processing Applications for Higher Education. Presentation at the National Conference on Higher Education, Washington, DC

Kolvoord, R.A. and M. Magisos (1997). Staff Development About Technology With Technology? Presentation at the National Science Teachers Association Annual Meeting, New Orleans, LA.

Kolvoord, R.A. (1997). Integrating Science and Technology at the College Level. Presentation at the National Science Teachers Association Annual Meeting, New Orleans, LA.

Kolvoord, R.A. (1997). Image Processing Applications for Science Education. Presentation at the Virginia Society for Technology in Education Annual Meeting, Virginia Beach, VA.

Kolvoord, R.A. (1997). Image Processing Applications for Science and Math. Presentation at the National Educational Computing Conference, Seattle, WA.

Magisos, M., R. A. Kolvoord, D. Alongi (1997). Curriculum Application of Image Analysis to Technological Education. Presentation at the National Science Foundation Advanced Technological Education Meeting, Washington, DC.

Kolvoord, R.A. (1998). Integrated Science and Technology at JMU. Presentation to the Shenandoah Valley Technology Consortium, Harrisonburg, VA.

Kolvoord, R.A. and others (1998). Integrated Science and Technology at JMU – Educational Technology Connections. Part of the Presentation to the LaSalle Univ. Visiting Group, Harrisonburg, VA.

Kolvoord, R.A. and M. Deaton (1998). Integrated Science and Technology at JMU. Presentation to the Central Shenandoah Valley Regional Governor's School Parents, Fishersville, VA.

Kolvoord, R.A. (1998). Integrated Science and Technology at JMU. Presentation at the National Consortium of Specialized Schools of Math, Science, and Technology Annual Meeting, Fairfax, VA.

Kolvoord, R.A. (1998). Data Visualization Applications for Math and Science. Presentation at the National Consortium of Specialized Schools of Math, Science, and Technology Annual Meeting, Fairfax, VA.

Kolvoord, R.A. (1998). Integrated Science and Technology at JMU. Presentation at the National Science Teachers Association Annual Meeting, Las Vegas, NV.

Kolvoord, R.A. (1998). Image Processing Applications for Your Classroom. Workshop at the Virginia Society for Technology in Education Annual Meeting, Roanoke, VA.

Kolvoord, R.A. (1998). Don't Avoid Your Eyes, Visualize!. Presentation at the National Educational Computing Conference, San Diego, CA.

Kolvoord, R.A. (1998). Staff Development Issues in GIS Training. Presentation at the ESRI Annual Users' Conference, San Diego, CA.

Kolvoord, R.A. (1998). Staff Development for Data Visualization. Presentation at the International Conference on Computer Education, Beijing, China.

Magisos, M., R. Kolvoord and S. Moore (1998). Applications of Image Analysis to Advanced Technological Education: Instructional Materials and Evaluation. Presentation at the NSF Advanced Technological Education PI Meeting.

Kolvoord, R.A. (1998). Case Study on the Planning of Educational Technology. Project Kaleidoscope Faculty of the 21st Century annual meeting, Chicago, IL.

Kolvoord, R.A. (1998). The Integrated Science and Technology Program at JMU. Presentation at the Virginia Association of Science Teachers annual meeting, Richmond, VA.

Kolvoord, R.A. (1998). Get the Picture – Visualization Tools for Science and Math. Presentation at the Virginia Association of Science Teachers annual meeting, Richmond, VA.

Kolvoord, R.A. (1998). In-service workshop for Fairfax County on Image Processing Applications for Biology, Fairfax, VA.

Kolvoord, R.A. (1998). Image Processing Curriculum for Technological Applications. National Science Foundation Advanced Technology Education PI Meeting, Washington, DC.

Kolvoord, R.A. (1999). Get the Picture – Data Visualization in Science and Math. Presentation at the Virginia Society for Technology in Education, Norfolk, VA.

Kolvoord, R.A. (1999). Articulated Curriculum in Integrated Science. A presentation at the National Consortium of Specialized Schools of Science, Mathematics and Technology Annual Meeting, Austin, TX.

Kolvoord, R.A. (1999). What's New in the Integrated Science and Technology Program at JMU. Presentation at the Virginia Association of Science Teachers annual meeting, Richmond, VA.

Kolvoord, R.A. (1999). Get the Picture – Visualization Tools for Science and Math. Presentation at the Virginia Association of Science Teachers annual meeting, Richmond, VA.

Kolvoord, R.A. (1999). Visualization Tools for Science and Math. A hands-on workshop at the Virginia Association of Science Teachers annual meeting, Richmond, VA.

Bauer, M., J.L. Barnes, and R.A. Kolvoord (1999). Digital Earth at JMU. Presentation at the NASA Earth Science Enterprise Education Meeting. Austin, TX.

Kolvoord, R.A. (2000). Get the Picture – Data Visualization in Science and Math. Presentation at the Virginia Society for Technology in Education, Roanoke, VA.

Kolvoord, R.A. (2000). Image Processing Applications in Science and Math. Workshop at the Virginia Society for Technology in Education, Roanoke, VA.

Kolvoord, R.A. (2000). Get the Picture – Data Visualization in Science and Math. Presentation at the National Educational Computing Conference, Atlanta, GA.

Kolvoord, R.A., and M. Charles (2000). Project VISM – Visualization in Science and Math. Presentation at the National Imaging Technology in Education Conference. Rochester, NY.

Kolvoord, R.A., and M. Charles (2000). Teacher's Use of Technology Tools. Presentation at the National Imaging Technology in Education Conference. Rochester, NY.

Kolvoord, R.A. (2000). Image Processing Applications in Science and Math. Workshop at the Virginia Association of Science Teachers Meeting. Richmond, VA.

Kolvoord, R.A. (2000). Integrated Science and Technology at JMU. Presentation at the Virginia Association of Science Teachers annual meeting, Richmond, VA.

Kolvoord, R.A. (2000). Image Processing Applications in Science and Math. Workshop at the NYSCATE Meeting, Albany, NY.

Kolvoord, R.A. (2000). Project VISM – Visualization in Science and Math. Presentation at the NYSCATE Meeting, Albany, NY.

Kolvoord, R.A. (2000). Data Visualization Tools for Science and Math. Workshop at the Project Kaleidoscope Faculty for the 21st Century Annual Meeting. Tucson, AZ.

Kolvoord, R.A. (2000). Image Processing Applications in Science and Math. Presentation at the Virginia Department of Education Educational Technology Leadership Conference. Roanoke, VA.

Kolvoord, R.A. (2001). Project VISM – Visualization in Science and Math. Presentation at the Florida Educational Technology Conference. Orlando, FL.

Charles, M. and R. A. Kolvoord (2001). Teacher's Use of Technology Tools – the Case of Project VISM. Presentation at the Society for Information Technology in Education Annual Meeting. Orlando, FL.

Kolvoord, R.A. (2001). Integrated Science and Technology Program at JMU. A presentation at the National Consortium of Specialized Schools of Science, Mathematics and Technology Annual Meeting. Worcester, MA.

Kolvoord, R.A. (2001). Project VISM – Visualization in Science and Math. A presentation at the National Consortium of Specialized Schools of Science, Mathematics and Technology Annual Meeting. Worcester, MA.

Cauley, L. and R.A. Kolvoord (2001). Engineering the 21st Century – Fall 2001 Student Conference. A presentation at the National Consortium of Specialized Schools of Science, Mathematics and Technology Annual Meeting. Worcester, MA.

Kolvoord, R.A. (2001). Get the Picture – Data Visualization in Science and Math. Workshop at the National Educational Computing Conference, Chicago, IL.

Kolvoord, R.A. (2001). Data Visualization in Science and Math. Interactive Workshop at the World Conference on Computers in Education. Copenhagen, Denmark.

Kolvoord, R.A. (2001). Image Processing Applications in Science and Math. Presentation at the Virginia Department of Education Educational Technology Leadership Conference. Roanoke, VA.

Kolvoord, R.A. (2001). Get the Picture - Image Processing Applications in Science and Math. Workshop at the Virginia Department of Education Educational Technology Leadership Conference. Roanoke, VA.

Kolvoord, R.A. and S. Purcell (2001). The New Educational Technology Master's at JMU. Presentation at the Virginia Department of Education Educational Technology Leadership Conference. Roanoke, VA.

Kolvoord, R.A. (2002). Project VISM – Visualization in Science and Math. A presentation at the National Consortium of Specialized Schools of Science, Mathematics and Technology Annual Meeting. Worcester, MA.

Kolvoord, R.A. (2002). Project GODI – Great Outdoors, Digital Indoors. Presentation at the Virginia Society for Technology in Education, Roanoke, VA.

Kolvoord, R.A. and S. Purcell (2002). The Educational Technology Master's at JMU. Workshop at the Virginia Society for Technology in Education, Roanoke, VA.

Kolvoord, R.A. (2002). Project VISM: Visualization in Science and Math. Presentation at the National Science Teachers Association Annual Meeting, San Diego, CA.

Kolvoord, R.A. (2002). Project GODI: Great Outdoors, Digital Indoors. Presentation at the National Educational Computing Conference, San Antonio, TX, June 2002.

Kolvoord, R.A., M. Blanchard and M. Klozik (2002). Project GODI: Great Outdoors, Digital Indoors. Panel Presentation at the Virginia Association of Science Teachers' Meeting, Richmond, VA, Nov. 2002.

Charles, M. and R. A. Kolvoord (2003). Teacher's Use of Technology Tools – Assessment of Project VISM. Presentation at the Hawaii International Conference on Education, Honolulu, HI, Jan. 2003.

Watson, C., S. Lovell, C. Klevickis, and R. Kolvoord (2003). Reinventing Science Education for Pre-Service Teachers. Panel presentation at the American Association of Colleges of Teacher Education, New Orleans, LA, Jan. 2003.

Kolvoord, R.A., M. Blanchard and M. Klozik (2003). Project GODI: Great Outdoors, Digital Indoors. Panel Presentation at the Virginia Society for Technology in Education Meeting, Crystal City, VA, Mar. 2003.

.

Hoffman, F. and R. Kolvoord (2003). Workshop on Geographic Information Systems for the National Consortium of Specialized Secondary Schools of Math, Science and Technology Meeting, Roanoke, VA, Mar, 2003.

Kolvoord, R. (2003). Integrated Science and Technology. Presentation at the International Organization for Science and Technology in Education Conference, Williamsburg, VA, May 2003.

Kolvoord, R. (2003). Re-inventing Science Education for Pre-Service Teachers. Presentation at the International Organization for Science and Technology in Education Conference, Williamsburg, VA, May 2003.

Kolvoord, R. (2003). Workshops on GIS and Data Visualization Given at the International Organization for Science and Technology in Education Conference, Williamsburg, VA, May 2003.

Kolvoord, R.A. (2003). Project GODI: Great Outdoors, Digital Indoors, An Update. Presentation at the National Educational Computing Conference, Seattle, Jun. 2003.

Handley M. and R. Kolvoord (2003). JMU IDLS Science Core. Presentation at the Virginia Middle School Education Conference. Harrisonburg, VA. Oct. 2003.

Kolvoord, R.A., M. Klozik, M. Blanchard, J. Dean, F. Obenschain, and M.J. Rowe (2003). Project GODI. Presentation at the Virginia Association of Science Teachers' Annual Meeting. Portsmouth, VA. Nov. 2003.

Kolvoord, R.A. (2003). GIS and GPS: What's the F.U.S.S. (Fun Using Them in Science and Social Studies). Presentation at the Virginia Educational Technology Leadership Conference. Roanoke, VA. Dec. 2003.

Kolvoord, R.A. (2004). The Integrated Science and Technology Program At JMU. Presentation at the National Consortium of Specialized Secondary Schools of Mathematics, Science and Technology Annual Meeting, New York, NY , Mar. 2004

Kolvoord, R.A. (2004). Project GODI: Great Outdoors, Digital Indoors. Presentation at the Virginia Society for Technology in Education, Roanoke, VA, Mar. 2004. Note – this presentation was given with a group of project teachers.

Kolvoord, R.A., L. Lineweaver and C. Warns (2004). GIS in the Middle School Classrom. Presentation at the Virginia Society for Technology in Education, Roanoke, VA, Mar. 2004

Charles, M. and R. A. Kolvoord (2004). Teacher's Stages of Development in Using Visualization Tools for Project-Based Science. Presentation at the National Educational Computing Conference, New Orleans, LA, June 2004.

Kolvoord, R.A. and K. Keranen (2004). GIS for K12 Critical Thinking: Developing Fire Risk Assessment Maps. Presentation at the ESRI Education Users Conference, San Diego, CA, Aug. 2004.

Kolvoord, R.A. (2004). Spatial Thinking with GIS. Presentation at the Virginia GIS Conference, Roanoke, VA.

Kolvoord, R.A. (2004). Introduction to GIS. Presentation at the Virginia Educational Technology Leadership Conference, Roanoke, VA

Kolvoord, R.A. (2004). GIS Applications in Science. Presentation at the National Science Teachers Association Regional Meeting, Richmond, VA

Kander, R. and R. A. Kolvoord (2004). The Integrated Science and Technology Program at JMU. Presentation at the National Science Teachers Association Regional Meeting, Richmond, VA

Kolvoord, R.A. (2005). Classroom Uses of GIS. Workshop at the Association of Educators of Teachers of Science Annual Meeting, Colorado Spring, CO.

Kolvoord, R.A. (2005). GIS Activities for Elementary Students. Presentation at the Virginia Society for Technology in Education, Norfolk, VA.

Klevickis, C and R. A. Kolvoord (2005). GSCI 16x Course Development. Presentation at the Madison Symposium, James Madison University, Harrisonburg, VA.

Kolvoord, R.A. (2005). GIS in Education. Presentation at the National Educational Computing Conference, Philadelphia, PA.

Kolvoord, R.A. and K. Keranen (2005). Introductory GIS Activities. Presentation at the Education Users Conference at the ESRI International Users Conference, San Diego, CA.

Kolvoord, R.A. (2005). GIS in Education. Presentation at the ESRI European Users Conference, Warsaw, Poland.

Kolvoord, R.A. (2005). GIS: What's It Good For and How Do I Get Started? . Presentation at the Virginia Association of Science Teachers Annual Meeting, Roanoke, VA.

Kolvoord, R.A. (2005). GIS Curriculum Applications. Presentation at the Virginia Educational Technology Leadership Conference, Roanoke, VA

Kolvoord, R.A. (2006). Integrating Geographic Information Systems in Classrooms: When, Where and Why. Presentation at the National Educational Computing Conference, San Diego, CA.

Kolvoord, R.A. (2006). The Geospatial Semester. Presentation at the Virginia GIS Conference, Roanoke, VA.

Kolvoord, R.A. and K. Keranen (2006). A Research-Based Scope and Sequence for GIS Use in Grades 4-12. Presentation at the Education Users Conference at the ESRI International Users Conference, San Diego, CA.

Kolvoord, R.A. (2006). Geospatial Semester: Connecting Content, Technology and Dual Enrollment . Presentation at the Virginia Association of Science Teachers, Richmond, VA.

Kolvoord, R.A. (2006). Geospatial Technologies - Mapping a Difference in the Classroom. Presentation at the Virginia Educational Technology Leadership Conference, Roanoke, VA.

Kolvoord, R.A. (2007). Geographic Information Systems: The ABC's of GIS. Presentation at the Virginia Educational Technology Leadership Conference, Roanoke, VA.

Kolvoord, R.A. and K. Keranen (2007). Finding a Place for GIS/GPS in the K-12 Curriculum. Presentation at the Virginia Society for Technology in Education, Virginia Beach, VA.

Kolvoord, R.A. (2007). Connecting Project-Based GIS Curricula with Secondary Students. Presentation at the IGU/HERODOT Conference on Innovative Curriculum, London, England.

Kolvoord, R.A. (2007). Integrating GIS Activities into Middle School Content Areas. Presentation at the National Educational Computing Conference, Atlanta, GA.

Kolvoord, R.A., D. Lewandowski, J. Ruffa, S. Tatum and R. Aadahl (2007). Geospatial Semester: Connecting High School Students to College Credit. Presentation at the Education Users Conference at the ESRI International Users Conference, San Diego, CA.

Blanchard, M. and R. Kolvoord (2007). Rural STEM Geospatial Lessons. Presentation at the Education Users Conference at the ESRI International Users Conference, San Diego, CA.

Kolvoord, R.A. (2007). Connecting Project-Based Curricula with Secondary School Presentation at the HERODOT/ESRI European User's Conference, Stockholm, Sweden

Kolvoord, R.A. and K. Keranen (2007). Geospatial Research and Thinking Initiative: Geospatial Semsester. Presentation at the Virginia Association of Mapping Information and Land Surveyors (VAMLIS), Richmond, VA.

Kolvoord, R.A. (2007). Mapping a Difference: GIS Applications for Science Classrooms. Presentation at the Virginia Association of Science Teachers, Williamsburg, VA.

Kolvoord, R.A. (2007). JMU's Geospatial Semester: Technology Driving Inquiry for High School Dual Enrollment. Presentation at the Virginia Educational Technology Leadership Conference, Roanoke, VA.

Kolvoord, R.A. (2007). GIS - Mapping a Difference in the Classroom. Workshop at the Virginia Educational Technology Leadership Conference, Roanoke, VA.

Kolvoord, R.A. (2008). Maps for Decision Making: GIS Curricula for Middle and High School. Presentation at the National Educational Computing Conference, San Antonio, TX.

Kolvoord, R.A. and K. Keranen (2008). The Geospatial Semester: Connecting High School and College Geospatially. Presentation at the Education Users Conference at the ESRI International Users Conference, San Diego, CA.

Kolvoord, R.A. (2008). GIS for Decision Making: Activities for Secondary Students. Presentation at the ESRI European User's Conference, London, England.

Milson, B, Coulter, B, Duke, R. Kolvoord, and D. Edelson (2008). Our World with MyWorld GIS. Presentation at the National Council for Geographic Education Conference, Dearborn, MI.

Kolvoord, R. (2008). Building Spatial Thinking with GIS: MS Activities. Presentation at the National Council for Geographic Education Conference, Dearborn, MI.

Kolvoord, R.A. (2008). GIS Activities for Earth Science. Presentation at the Virginia Association of Science Teachers Professional Development Institute, Williamsburg, VA.

Kolvoord, R.A., C. Bunin, and P. Rittenhouse (2008). GIS/GPS in the Classoom – How Are These Technologies Enhancing Student Learning – Reports from the Field. Presentation at the Virginia ASCD Conference, Williamsburg, VA.

Kolvoord, R.A. (2008). GoogleSpatial Technologies - Maps as a key to problem solving. Presentation at the Virginia Educational Technology Leadership Conference, Roanoke, VA.

Kolvoord, R,A, and K. Keranen (2009). The Geospatial Semester: Connecting High School Students, Geospatial Tools and the Real World. Presentation at the Towson University GIS Conference, Towson, MD.

Kolvoord, R.A. and K. Keranen (2009). Planning a Scope and Sequence for Integrating GIS and Spatial Thinking in K-12 Schools. Presentation at the Association of American Geographers Annual Meeting, Las Vegas, NV.

Kolvoord, R.A. (2009). GoogleSpatial Technologies: Maps Building Better Problem-Solving Skills. Presentation at the National Educational Computing Conference, Washington, DC.

Kolvoord, R.A. and K. Keranen (2009) Geospatial Semester: Connecting High School and College with GIS. Presentation at the Education Users' Conference at the ESRI International Users' Conference, San Diego, CA.

Keranen, K and R. Kolvoord (2009) Making Spatial Decisions in Earth and Environmental Science: New Curricula. Presentation at the Education Users' Conference at the ESRI International Users' Conference, San Diego, CA.

Kolvoord, R.A. (2009). GIS Activities for Earth and Environmental Science. Presentation at the Virginia Association of Science Teachers' Annual Meeting, Herndon, VA.

Kolvoord, R.A. (2009). The GoogleSpatial World: Building Students' Critical (and Spatial) Thinking Skills Across the Curriculum. Presentation at the Virginia Society for Technology in Education, Roanoke, VA.

Kolvoord, R.A. and K. Keranen (2010). The Geospatial Semester: Mapping a Difference for High School Seniors. Presentation at the Association of American Geographers Annual Meeting, Washington, DC.

Kolvoord, R.A., M. Charles and S. Purcell (2010). What Happens After the Professional Development: Case Studies on Implementing GIS in the Classroom. Presentation at the National Association for Research on Science Teaching Annual Meeting, Philadelphia, PA.

Kolvoord, R.A. (2010). Google Earth and Beyond: Building Student Spatial-Thinking Skills. Presentation at the National Educational Computing Conference, Denver, CO.

Kolvoord, R.A. and K. Keranen (2010). What Are They Thinking: Studying Students' Spatial Thinking Skills. Presentation at the Education Users Conference at the ESRI International Users Conference, San Diego, CA.

Keranen, K. and R. Kolvoord (2010). The Geospatial Semester. Presentation at the Education Users Conference at the ESRI International Users Conference, San Diego, CA.

Kolvoord, R. (2010). Building Spatial Thinking and Decision Making Skills in Secondary Students Using GIS: The Geospatial Semester. Presentation at the Learning with Geoinformation Conference, Salzburg, Austria.

Kolvoord, R. (2010). Mapping a Difference, GIS Curriculum for Secondary Students. Workshop at the Learning with Geoinformation Conference, Salzburg, Austria.

Harvey, F., K. Donert, B. Belina, and R. Kolvoord (2010). Spatial Citizenship. Panel presentation at the Learning with Geoinformation Conference, Salzburg, Austria.

Kolvoord, R. (2010). The Geospatial Semester: H.S. Students Mapping a Difference. Presentation at the National Council for Geographic Education Conference, Savannah, GA.

Kolvoord, R. and K. Keranen (2010). Supporting Decision Making with GIS – A Preview of a New Set of ArcGIS Lessons. Workshop at the National Council for Geographic Education Conference, Savannah, GA.

Barron, K. E., Hulleman, C. S., & Kolvoord, B. (2011). The role of motivational planning and assessment: How to create STEM classrooms and programs that attract, engage, and retain students. Workshop to be presented at the Engaged STEM Learning conference sponsored by the American Association of College and Universities, Miami, FL.

Kolvoord, B (2011). The GoogleSpatial World: Making Classrooms a Spatial Place. Spotlight session at the International Society for Technology in Education Annual Meeting, Philadelphia, PA

Kolvoord, R. A., D.Uttal, L. Linewaver and N. Meadow (211). GIS Impact on Students' Use of Spatial Language and Gesture. International Education Users Conference, ESRI, San Diego, CA.

Kolvoord, R. A. K Keranen (2011). Geospatial Semester: Connecting GIS, HS Students and Community-Based Projects. International Education Users Conference, ESRI, San Diego, CA.

Kolvoord, R. A. (2011). Panel Presentation on State GIS Site License. International Education Users Conference, ESRI, San Diego, CA.

Kolvoord, R. A. L. Linewaver, D. Uttal and N. Meadow (2011). Investigating Students' Spatial Thinking Skills Using Classroom Video. Presentation at the National Council on Geographic Education Annual Meeting, Portland, OR.

Kolvoord, R. A., K Keranen (2011). Geospatial Semester: Building Spatial Thinking Skills in Secondary Students with GIS. Presentation at the European Education Users Conference, ESRI, Madrid, Spain.

Kolvoord, R. A., D.Uttal, and N. Meadow (2012). Building Students' Spatial Thinking Skills with GIS: Video Case Studies. Paper presented at Association of American Geographers Annual Meeting, New York, NY. I also chaired the session this paper was in and served as a co-organizer with a Korean colleague.

Kolvoord, R. and P. Rittenhouse (2012). Getting GIS for your school and district: Virginia's GIS Site License. Presentation at the Virginia Society for Technology in Education Annual Meeting, Roanoke, VA.

Kolvoord, R. (2012). The Geospatial Semester: Making Inquiry Happen in the Classroom. Presentation at the Virginia Society for Technology in Education Annual Meeting, Roanoke, VA.

Kolvoord, R. and P. Rittenhouse (2012). Making Interactive Maps in a Browser (or What's Better than Google Earth?!?!?). Workshop at the Virginia Society for Technology in Education Annual Meeting, Roanoke, VA.

Kolvoord, R. (2012). Design as the Spine: A New Take on Engineering at James Madison University. Paper presented at the American Society for Engineering Education regional meeting at Mississippi St. University, Starkville, MS.

Charles, M and R. A. Kolvoord, (2012). Geospatial Semester: Developing Students' 21st Century Thinking Skills with GIS. Paper presented at the International Society for Technology in Education Conference, San Diego, CA.

Kolvoord, R.A. (2012). Mapping A Difference: Teaching and Learning in a GoogleSpatial World. Spotlight session presented at the International Society for Technology in Education Conference, San Diego, CA.

Keranen, K. and R. Kolvoord (2012). Remote Sensing Activities for ArcGIS. Presentation at the Education Users' Conference at the ESRI International Users' Conference, San Diego, CA.

Kolvoord, R.A. D. Uttal, N. Goldin-Meadow, E. Wilkerson and L. Lineweaver (2012). Does GIS Impact Students' Spatial Thinking Skills. Presentation at the Education Users' Conference at the ESRI International Users' Conference, San Diego, CA

Kolvoord, R. A. (2012). Panel Presentation on State GIS Site License. International Education Users' Conference, ESRI, San Diego, CA.

Hinde, E., M. Kenney, J. Smothers-Marcello, R. Kolvoord and R. Morrill. (2012). The Geography Assessment Framework: The NSF Roadmap for Geography Education. Panel Presentation at the National Council on Geographic Education Annual Meeting, San Marcos, TX.

Kolvoord, R.A. (2012). The Impact of GiS on Students Spatial Thinking Skills. Paper presented at the National Council on Geographic Education Annual Meeting, San Marcos, TX.

Kolvoord, R.A. (2012). Making Design the Spine: Creating a New General Engineering Program. Poster presented at the American Association of Colleges and Universities STEM Conference, Kansas City, MO.

Kolvoord, R.A. (2012). The Geospatial Semester: Mentored Dual Enrollment. Poster presented at the American Association of Colleges and Universities Next Generation STEM Learning Conference, Kansas City, MO.

Kolvoord. R.A. (2012). A New Look at Engineering: The General Engineering Program at JMU. Presentation at the NCSSSMST Annual Conference, Denver, CO.

Kolvoord. R.A. (2013). Sustaining the Future: JMU Engineering. Panel Discussion at VCU 2013 Energy and Sustainability Conference, Richmond, VA.

Kolvoord, R. A., D.Uttal, and E. Wilkerson (2013). What Impacts Does GIS Have on Students' Spatial Thinking Skills. Paper presented at Association of American Geographers Annual Meeting, Los Angeles, CA.

Kolvoord, R. and M. Charles (2013). Geospatial Semester: Developing Students' 21st Century Thinking Skills. Presentation at the Education Users' Conference at the ESRI International Users' Conference, San Diego, CA.

Keranen, K. and R. Kolvoord (2013). Making Spatial Decisions Using Remote Sensing. Lightning Talk at the Education Users' Conference at the ESRI International Users' Conference, San Diego, CA.

Kolvoord, R.A. D. Uttal, E. Wilkerson, and M. Charles (2013). Researching the Impact of GIS on Students' Spatial Thinking Skills. Presentation at the Education Users' Conference at the ESRI International Users' Conference, San Diego, CA.

Kolvoord, R., K. Keranen, and P. Rittenhouse (2013). The Geospatial Semester Goes Mobile. Presentation at the Education Users' Conference at the ESRI International Users' Conference, San Diego, CA.

Kolvoord, R.A. (2013). How Does GIS Use Impact Students' Spatial Thinking? Paper presented at the National Council on Geographic Education Annual Meeting, Denver, CO.

Kolvoord, R.A. (2013). The Geospatial Semester: Exploring Integrative Learning Via Dual Enrollment. Poster presented at the American Association of Colleges and Universities Next Generation STEM Learning Conference, San Diego, CA

Kolvoord, R.A. (2013). The Impact of GIS on Students' Spatial Thinking Skills. Presentation at the ESRI Europe, Middle East, and Africa Users Conference, Munich, Germany.

Kolvoord, R.A. et al (2014). Bridging the Valley. Poster at the NSF STEP Grant Conference, Washington, DC.

Kolvoord, R. (2015). The Geospatial Semester: Engaging K-12, Higher Ed, and Local Communities, Poster Presentation at Engagement Scholarship Consortium, Penn State.

Kolvoord, R. (2016). Presented a session on The Impact of GIS on K-12 Students' Spatial Thinking Skills at the American Association of Geographers Annual Meeting, San Francisco, March 2016.

Kolvoord, R., E. Peterson and D. Uttal (2016). This is Your Brain on GIS. Presentation at the ESRI Education Users Conference, San Diego, CA. Note – paper was accepted, but I was unable to attend the conference.

Kolvoord, R., E. Peterson, A. Green, A. Goldman, D. Uttal, and E. Hollenbeck (2016). The Impact of Geospatial Technologies on Students' Spatial Thinking Skills. Presentation at the National Council for Geographic Education Annual Meeting, Tampa, FL.

Kolvoord, R. (2016). Rewarding What We Value: The Role of Promotion and Tenure Guidelines. Workshop at the AAC&U Meeting on Transforming Undergraduate STEM Education, Boston, MA.

Peterson, E. G., Kolvoord, R., Uttal, D. H., Goldman, D., Hollenbeck, E., Kraemer, D. J. M., & Green, A. (2016). *Spatial thinking in the high school classroom: Cognitive and neural effects of the Geospatial Semester.* Paper presented at the conference of the International Mind, Brain and Education Society, Toronto, Canada.

Peterson, E. G., Green, A., Kolvoord, R., Goldman, D., Hollenbeck, E., & Uttal, D. (2016). *Childhood and adolescent spatial activities, spatial ability, and spatial habits of mind*. Paper presented at the conference on Spatial Cognition, Philadelphia, PA.

Peterson, E. G., Goldman, D., Uttal, D., Kolvoord, R., & Green, A. (2016). *The role of spatial ability in spatial and non-spatial syllogistic reasoning*. Paper presented at the conference on Spatial Cognition, Philadelphia, PA.

Peterson, E. G., Mendez, P., Sweetser, B., Dinh, N., Kolvoord, R., Uttal, D. H., & Green, A. (2017). Structural plasticity in parietal cortex associated with real-world classroom education. Poster to be presented at the annual meeting of the Society for Neuroscience, Washington, DC.

Cortes, R., Mendez, P., Peterson, E., Kolvoord, R., Uttal, D., Goldman, D. & Green, A. (2017). Gender differences in spatial ability among adolescents. Poster presented at the 29th Association for Psychological Sciences Annual Convention in Boston, MA.

Hollenbeck, E., Uttal, H. D. Kolvoord, Peterson, E. G., Green (2017). Promoting the development of higher level spatial thinking with Geographic Information Systems instruction. In B. Kolvoord (chair), *Supporting spatial thinking to enhance STEM learning.* Symposium conducted at the annual meeting of the American Educational Research Association, San Antonio, Texas.

Peterson, E. G., Kolvoord, R., Kraemer, D. J. M., Uttal, D. H., Goldman, D., & Green, A. (2017). *Training spatial thinking in the high school classroom impacts cognitive and neural correlates of verbal relational reasoning*. Paper presented at the annual meeting of the Cognitive Neuroscience Society, San Francisco, CA.

Kolvoord, R., E. Peterson, A. Green, and D. Uttal (2017). The Impact of Geospatial Technologies on Students' Spatial Thinking Skills: Behavioral and Neurological Measures. Presentation at the American Association of Geographers Annual Meeting, Boston, MA.

Kolvoord, R.A., Peterson, E., Uttal, D., Green, A., Hollenbeck, E., & Kraemer, D. (2018). *Does GIS Impact Secondary Students' Spatial Thinking Skills: Cognitive and Behavioral Studies.* Presentation at the AAG Annual Meeting, New Orleans, LA.

Muenks, K. M., Peterson, E. G., Uttal, D., Kolvoord, R., & Green, A. (2018). Parents' beliefs about students' spatial abilities predict students' intentions to major in STEM. Paper presented at the annual meeting for the International Conference on Motivation, Aarhus, Denmark.

Peterson, E. Kolvoord, B., Uttal, D., & Green, A. (2018). Latent Factors of Mental Rotation Accuracy and Speed: An Item Response Theory Analysis. Paper presented at the International Conference on Spatial Cognition, Rome, Italy.

Peterson, E. Kolvoord, B., Uttal, D., & Green, A. (2018). Individual Differences in the Improvement of Spatial Thinking following a High School Geoscience Course. Paper presented at the International Conference on Spatial Cognition, Rome, Italy.

Kolvoord, R.A. (2018). Cognitive Impacts of Geospatial Technology Use by High School Students. Presentation at the ESRI Education Users Conference, San Diego, CA.

Kolvoord, R.A. (2018). Does GIS Use Impact K-12 Students' Spatial Thinking Skills? Evidence a Behavioral and Cognitive Study. Presentation at the National Council on Geographic Education (also IGU Regional Conference), Quebec City, QE, Canada.

Kolvoord, R., Peterson, E. G., Uttal, D., & Green, A. (2018). Cognitive and motivational changes in adolescents' spatial thinking: Effects of the Geospatial Semester. Poster presented at the meeting of Spatial Cognition, Tuebingen, Germany.

Cortes, R., Dinh, N., Weinberger, A., Peterson, E., Daker, R., Kolvoord, B., Uttal, D., & Green, A. (2018). Cognitive and Neural Effects of Geospatial Education on Deductive Reasoning. Poster Presented at the International Mind, Brain and Education Society at the University of Southern California in Los Angeles, CA.

Peterson, E., Dinh, N., Weinberger, A., Cortes, R., Daker, R., Kolvoord, B., Uttal, D., & Green, A. (2018). Cognitive and Neural Indicators of Spatial Thinking: Effects of a High School Geoscience Course. Poster Presented at the International Mind, Brain and Education Society at the University of Southern California in Los Angeles, CA.

Kolvoord, R.A., M. Wagner, K. Keranen, & P.Rittenhouse (2018). The Geospatial Semester: Loudoun County Schools and JMU Partnership for Student Community Engagement. Presentation at the Engagement for the Public Good Conference, James Madison University, Harrisonburg, VA.

Conley, S., J. Henriques, A. Goodall, K. Holland, H. Way, J. Miles, P. Goodall, & B. Kolvoord (2018). Sustainable Engagement Study Abroad: A Case Study in International Collaboration between James Madison University and Maltese Non-profit Institutions. Presentation at the Engagement for the Public Good Conference, James Madison University, Harrisonburg, VA.

Cortes, R., Dinh, N.,Peterson, E., Weinberger, A., Daker, R., Kolvoord, B., Uttal, D., & Green, A. (2019). Cognitive and Neural Effects of Geospatial Education on Deductive Reasoning. Poster Presented at the Cognitive Neuroscience Society meeting in San Francisco, CA.

Kolvoord, R.A., Uttal, D., Peterson, E., Green, A. & Kraemer, D. (2019). *The Impact of GIS Use on High School Students' Spatial Thinking: Cognitive and Behavioral Measures.*

Presentation at the AAG Annual Meeting, Washington, DC.

Kolvoord, R.A. (2019). Cognitive Impact of GIS Use by K-12 Students: Their Brains on GIS! Presentation at the ESRI Education Users Conference, San Diego, CA.

Peterson, E., Weinberger, A., Uttal, D., Kolvoord, R., Green, A. (2020). *Gender Moderates the Effects of Childhood Spatial Activity Participation on Adolescents' Spatial Activites and Spatial Thinking.* Presentation at the Society of Research on Adolescence Biennial Meeting.

Cresawn, K., Bauerle, C. & Kolvoord, B. (2019). Building Cross-Campus Collaborations for Excellence in K-12 STEM Outreach. Presentation at the American Association of Colleges and Universities Transforming STEM Higher Education Meeting, Chicago, IL.

Kolvoord, B., Peterson, E.G., Uttal, D., and Green, A. (2020). How Does Extended GIS Use Impact Spatial Thinking? Presentation at the Association of American Geographers Annual Meeting, Denver, CO. Due to the pandemic, I presented at the virtual conference.

Kolvoord, R.A. (2020). GIS Use Leads to Far Transfer in Spatial Thinking: fMRI Studies. Presentation at the ESRI Education Users Conference, San Diego, CA. This conference was postponed due to the pandemic.

Kolvoord, R.A., Scott Johnson, P. and Fernandes, G. (2020). COVID-19 and STEM Learning Spaces: Current Changes and Future Opportunities. Workshop at the AAC&U Conference on Transforming STEM Education, virtual, November 2020.

Scott Johnson, P., Kolvoord, R.A., Singer, S.R. and J.L. Narum (2021). The Impact of COVID-19 on Shaping Spaces for Learning. Presentation at the AAC&U Annual Meeting, virtual.

Kolvoord, B., Uttal, D., Peterson, E.G., and Green, A. (2021). The Case for GIS in High School: Impact on Students' Spatial Thinking Skills. Presentation at the Association of American Geographers Annual Meeting, virtual.

Kolvoord, R.A. (2021). Can We Measure Cognitive and Behavioral Changes in Students from GIS Use? Yes! Presentation at the ESRI Education Users Conference, San Diego, CA, virtual.

Kolvoord, B, and Peterson, E.G. (2021). GIS in Secondary Education: The First Steps in Developing Geospatial Expertise. Presentation at Spatial Cognition 2021 Symposium on the Development of Geospatial Expertise, Riga, Latvia. Virtual.

Kolvoord, B. (2022). GIS and Students' Spatial Thinking Skills: Cognitive and Behavioral Impact. Webinar for National Council on Geographic Education Annual Meeting. Virtual.

Kolvoord, B. (2022). How Do High School Students Use GIS for Spatial Problem Solving. Presentation at the Association of American Geographers 2022 Annual Meeting. Virtual.