

**DEPARTMENT OF CURRICULAR AND INSTRUCTIONAL STUDIES
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Education

Ph.D.	2011	Illinois Institute of Technology, Chicago, IL, Science Education <i>Dissertation:</i> The Impact of Professional Development in Informal Science Contexts on Teachers' Content Knowledge and Discourse <i>Advisors:</i> Norman G. Lederman and Judith S. Lederman
M.Ed.	2006	Lesley University, Cambridge, MA, Science Education
M.A.	1992	Lesley University, Cambridge, MA, Art Therapy
B.A.	1990	Boston College, Chestnut Hill, MA, Psychology, Minor – Fine Arts

Work Experiences

2011-Present	Assistant Professor of Science Education , Department of Curricular and Instructional Studies, The University of Akron, Akron, OH.
2006-2011	Research Assistant , Department of Mathematics and Science Education, Illinois Institute of Technology, Chicago, IL.

Project Involvement:

High School Transformation Project, Assessment Co-Lead, 2006-2011

A four year grant funded by the Melinda and Bill Gates Foundation designed provide professional development, instructional support and curriculum materials for Chicago Public School teachers of Biology, Chemistry, and Physics.

Primary responsibilities included:

- developing formative and summative assessment items for student tests,
- working with Chicago Public School and American Institutes for Research staff to format individual items and assessments for all three content areas,
- working closely with HSTP project manager and coaches when developing and approving items and assessment forms
- attending item review, data review, and standard setting meetings.

- assisting in the collection of data (e.g., pre/post questionnaires), data analysis, and presentation at professional meetings.
- assisting with and leading professional development workshops regarding assessment.

Student Teacher Supervision, 2010-2011

Supervision of student teachers in biology classrooms, including weekly meetings with and observation of the student teacher.

Taiwan Teacher Professional Development, 2010

A one-week PD at the Illinois Institute of Technology for secondary gifted/talented math and science teachers from Taiwan. Addressing effective teaching strategies, research design, clinical supervision, informal education, and assessment.

Illinois Math and Science Academy Aurora, IL 2008-2011

Responsible for ongoing assessment and assisting with scoring of instruments to measure the school's gifted sophomores and seniors understanding of nature of science and scientific inquiry.

IIT/Essex Large Scale Assessment Project, 2007-2010

Responsible for working with a research group at the University Duisburg-Essen, Germany, and assisting with:

- development of an instrument with a historical context to assess students (15-16 yrs of age) and competencies regarding nature of science and scientific inquiry
- evaluating assessment items for readability for students in the United States
- administering instruments in the United States
- reviewing and editing proposals for national and international meetings.

Illinois State Board of Education (ISBE) Pre-service Program Accreditation, 2008-2010

Assisted with preparing for site visit (October 2010) and editing/formatting of various reports for submission to ISBE.

Sir Miles Davis Magnet Academy Professional Development, Chicago, IL, 2008-2010

Assisted with preparing for and conducting a series of workshops for elementary and middle school staff. Primary focus was on developing Science, Technology, Engineering, and Mathematics (STEM) curriculum for all grade levels.

Taiwanese Middle School Gifted Science Camp 2006-2009, 2011

An annual two-week science camp at the Illinois Institute of Technology focusing on nature of science, scientific inquiry and technology. Responsible for teaching life science classes covering anatomy, taxonomy, natural selection, and ecology.

Project Way 2 Go funded by NSF 2006-2008

A research project comparing inquiry-based instruction to direct instruction.

Assisted instructors (e.g., fidelity to the teaching method)

Reviewed lesson plans

Project manager (2007-2008)

An International, Systematic Investigation of the Relative Effects of Inquiry and Direct Instruction, 2007

Assisted with scoring and data analysis for a joint project with IIT, Chicago, and Stockholm University, Sweden.

Korean Teacher Professional Development, 2006

A summer two-week PD at the Illinois Institute of Technology for secondary Korean teachers.

- Assisted in teaching classes on the use of technology in the classroom (probeware, computers, calculators, etc.)
- Assisted in teaching classes on explicit and reflective instruction of the nature of science

Courses Taught:

Instructional Methods for Pre-Service Teachers

Informal Education Practicum and Seminar

Inquiry and Nature of Science

Guest Speaker in Courses:

Qualitative Research Methods (Fall '09)

Responsible for teaching doctoral students about using digital and printed resources for conducting research.

Middle & Secondary Level/ Curriculum/Foundations (April '09)

Responsible for teaching graduate students about diversity.

Action Research (September '07)

Responsible for teaching graduate students about using SPSS and providing a statistics tutorial

Action Research (Summer '10)

Responsible for teaching masters students about using digital and printed resources for conducting research.

Mentoring:

Statistics and SPSS mentor for students in Action Research (2007-2010)

2009-2010 **Science Teacher**, Perspectives / IIT Math and Science Academy, Chicago, IL
Responsibilities included teaching and developing curriculum for a ninth grade integrated biology class with a focus on biotechnology and ecotechnology.

2000-2006 **Coordinator of Outreach Services**, Education Department,
New York Aquarium, Wildlife Conservation Society, Brooklyn, NY
Primary responsibilities included:

- developing pre-K - 16 marine science lessons
- coordinating programs for outreach staff members
- supervising outreach staff members.

Science Teacher, New York Aquarium School Partners

Responsibilities included year-long science teaching at the following schools:

- PS 81 Robert J. Christen School (K-6)
- PS 206 Horace Harding School (K-6)
- PS 208 Elsa Ebeling School (K-6)
- PS 238 Anne Sullivan School (K-6)
- PS 288 Shirley Tanyhill School (K-6)
- PS 329 Surfside School (K-6)
- St. Josephs Hill Academy (K-6)

Special Education Science Teacher, New York Aquarium School Partners

Responsibilities included year-long science teaching for special needs classes at the following schools:

- PS 30 R. Hernandez / L. Hughes School
- PS 48 William C. Wilcox School
- PS 117 J Keld Briarwood School
- PS 138 M
- PS 370 K Jim Thorpe School
- PS 721 K Brooklyn Occupational Training Center

Professional Development, Education Department, New York Aquarium,
Wildlife Conservation Society, Brooklyn, NY.

2000-2006 *Docent Training*. Workshops presented for the New York Aquarium Education Department, Brooklyn, NY.

2004-2006 *Marine Invertebrates and Vertebrates*. Workshops presented for the special education faculty at PS 721 K, Brooklyn Occupational Training Center, Brooklyn, NY.

2005 *Scientific Methods/ Inquiry/ Research*. A two-day workshop presented for faculty at PS 176, Ovington School, Brooklyn, NY.

- 2003-2005 *Working with Special Needs Populations*. A series of workshops presented for instructors in the Wildlife Conservation Society Education Department, Bronx, NY.
- 2004 *Marine Invertebrates and Vertebrates*. A workshop for special education faculty at PS 23Q, Queens Children Center, Queens, NY.
- 2003 *Marine Invertebrates and Vertebrates*. A workshop presented to faculty at the Rikers Island Correctional Facility High School, Queens, NY.
- 2003 *Marine Invertebrates, Fish and Sharks, Whales*. A workshop presented to 3-5 grade faculty at PS 215, Morris H. Weiss School, Brooklyn, NY.
- 2001-2002 *Marine Invertebrates and Vertebrates*. Workshops presented for the special education faculty at PS 138 M, NY, NY.
- 1995-2000 **Museum Educator**, Education Department, Museum of Natural History & Planetarium, Roger Williams Park, Providence RI,
Responsibilities included:
- teaching K-12 curriculum based science programs
 - developing K-12 curriculum
 - assisting with professional development for K -12 teachers
- 1994-1995 **Program Assistant**, Families Together, Providence Children's Museum, Providence, RI
Responsibilities included coordinating, supervising and guiding high-risk, separated families (clients of the Department of Children, Youths and Families (DCYF) and Family Court) for weekly visitations in the museum exhibit areas.

Related Work Experiences

- 2005 **Instructor**, Brooklyn College, Brooklyn, NY.
Selected environmental concepts in the biological sciences for elementary and middle school in-service teachers.
- 2002-2005 **Instructor**, American Museum of Natural History, New York, NY.
Responsibilities included producing and conducting marine science programs at the museum for children and parents.
- 1992-2000 **Education Consultant for the Neonatal Intensive Care Unit**, Women and Infants' Hospital, Providence, RI.
Responsibilities include running the Kids' Klub Visitation Program, a weekly group for siblings, ages 3 - 12, of high risk and/or premature infants,

planning and conducting appropriate weekly activities to further understanding of the babies and the hospital environment, working in conjunction with hospital social workers, psychologists, nursing staff and volunteers.

- 1992-1993 **Counselor**, Communities for People, Providence, RI,
Responsibilities included supervising and monitoring high-risk adolescent boys in a group home setting.
- 1991-1992 **Counseling Intern**, Bay Cove Mental Health Clinic, Lemuel Shattuck State Hospital, Jamaica Plain, MA,
Responsibilities included running individual and group therapy sessions on four wards (a day treatment center, an admissions ward, a long-term ward and a short-term ward) with adolescents and adults in a psychiatric setting.
- 1990-1991 **Counseling Intern**, Cotting School, Lexington, MA,
Responsibilities included running individual and group therapy sessions in a K-12 school setting for students with multiple physical and/or learning disabilities.

Consulting

- 2010 **Science Editorial Reviewer**, *National Geographic Science: Teachers Editions, Science Inquiry and Writing Books (3-5th Grade Life Science, Earth Science, and Physical Science)*, by Randy Bell, Judith Lederman, Malcolm Butler, Kathy Cabe Trundle, and David Moore. National Geographic School Publishing, Hampton-Brown: Washington DC.
- 2006-2011 **Science Trainer**, Zula International, Burbank, CA.
Responsible for conducting workshops for pre-K through 2nd grade teachers about using public television programming and associated materials to enhance science, mathematics, and reading literacy in the curriculum.
WTTW PBS Television Studio, Chicago, IL (November, 2006)
Adler Planetarium, Chicago, IL (December, 2006)
WTTW PBS Television Studio, Chicago, IL (October, 2007)
Adler Planetarium, Chicago, IL (April 24 & 25, 2009)
Headstart, New Orleans, LA (November, 2009)
Headstart, Washington, DC (January 14 & 15, 2010)
Department of Education, Queens, NY (June 10, 2010)
Summer Institute: Focus on Inquiry, Washington, DC (June 24 & 25, 2010)
Headstart, Alexandria, VA (August 31, 2010)
NYC Education Department, Manhattan, NY (March 30, 2011)
- 2004 **Illustrator and Designer**, Wildlife Conservation Society, Bronx, NY.
Large format storyboards for PreK-3 education programs:
Elly Jelly looks at marine animals: The birthday feast

Elly Jelly looks at marine animals: The right move
 Elly Jelly looks at marine animals: Elly Jelly's surprise
 Happy Hermit.
 Can you do it?

- 2003 **Science Editorial Reviewer**, Wildlife Conservation Society, Bronx, NY.
 K-3 marine science curriculum (readers, teacher guides, and workbooks):
 Elly Jelly looks at marine animals: Elly Jelly's surprise.
 Elly Jelly looks at marine animals: Big Wilma.
 Elly Jelly looks at marine animals: The right move.
 Elly Jelly looks at marine animals: The color changer.
 Elly Jelly looks at marine animals: The best defense.
 Elly Jelly looks at marine animals: The birthday feast.

- 2002 **Science Editorial Reviewer**, Penguin Putnam Publishers, NY, NY.
All Aboard Science Reader: Whales (Grades 1 - 3), by Graham Faiella.

Museum Exhibit Productions

- 1998 Designed, produced exhibit features, and installed *Joint Ventures*, an exhibition produced for the Museum of Natural History, Providence, RI
- 2000 Designed and installed *Circle of the Sea*, an exhibition for the Museum of Natural History, Providence, RI

Research and Scholarship

Publications

- Keough, T., Sweeney, J.K., & Holliday, G.M. (2002). *Circle of the sea: Creations from Oceania*. Museum of Natural History, Roger Williams Park. Providence, RI.
- Zilker, I., Holliday, G.M., Fischer, H.E., Kauertz, A., Lederman, J.S., & Lederman, N.G. (2010). Are historical contexts suitable for assessing students' competences in the field of nature of science and scientific inquiry? In M.F. Taşar & G. Çakmakkı (Eds.), *Contemporary science education research: International perspectives* (pp. 237-244). Ankara, Turkey: Pegem Akademi.
- Lederman, J.S., Holliday, G.M., & Lederman, N.G. (in press). The impact of exhibit-based professional development on teacher's pedagogical content knowledge. In *Understanding Interactions at Science Centers and Museums: Sociocultural Perspectives*. Sense Publishers: The Netherlands.

Presentations at Professional Meetings

International

Lederman, J., Holliday, G., Lederman, N., & Babcock, E. (2007, August). *Changes in biology teachers' attitudes and behavior toward informal learning sites: An urban case study*. Paper presented at the international conference of the European Science Education Research Association: Malmo, Sweden.

Zilker, I., Holliday, G.M., Kauertz, A., Fischer, H.E., Lederman, J.S., & Lederman, N.G. (2009, August). *Are historical contexts suitable for assessing students' competences in the field of nature of science and scientific inquiry?* Paper presented at the international conference of the European Science Education Research Association: Istanbul, Turkey.

Holliday, G.M. (2010, April). *Working with gifted and talented students in an integrated biology classroom*. Invited paper presented at the International Conference on Mathematics and Science Gifted Education and Teacher Education: Changhau, Taiwan.

Lederman, J.S., Lederman, N.G., Holliday, G.M. (2011, January). *Project SLICE: Science learning through inquiry, content, and engagement*. Paper presented at the international conference of the Southern African Association for Research in Mathematics, Science, and Technology Education: Mmabatho, South Africa.

Lederman, J.S., Lederman, N.G., Meyer, D.Z, Antink-Meyer, A, Bartos, S.A., & Holliday, G.M. (2011, July). *The fragile nature of teachers' views of nature of science (NOS)*. Paper presented at the 11th International IHPST and 6th Greek History, Philosophy and Science Teaching Joint Conference: Thessaloniki, Greece.

Lederman, J.S., Lederman, N.G., Holliday, G.M. (2011, September). *Project SLICE: Science learning through inquiry, content, and engagement*. Paper accepted at the international conference of the European Science Education Research Association: Lyon, France.

National

Meyer, E.C., Kennally, K., Zika-Beres, E., & Holliday, G. (1995) *Kids' Klub: Support, education, and visitation for siblings of high-risk infants*. Paper presented at the National Conference of the Association for the Care of Children's Health: Boston, MA.

Babcock, E., Willie, S., Holliday, G., & Alvelo-Santiago, M. (2007, May). *Museum and university partnerships: Transforming urban public high schools in Chicago*. Paper presented at the annual meeting of the American Association of Museums: Chicago, IL.

Tompkins, A., Lederman, J., Roelle, B., Schmidt, C., Minerva, C., & Holliday, G. (2007, November). *The zula patrol - ready, set, science workshop: A model for implementing science and astronomy in pre-K to second-grade classrooms*. Session presented at the annual meeting of the National Association for the Education of Young Children: Chicago, IL.

- Meyer, D., Avery, L.M., Antink, A., Connell, M.G., & Holliday, G.M. (2008, March). *Using Excel as a qualitative data analysis tool*. Session presented at the annual meeting of the American Educational Research Association: New York, NY.
- Holliday, G.M., Lederman, N.G., & Lederman, J.S. (2008, March). *Using personal meaning mapping to assess learning at a natural history museum*. Paper presented at the annual meeting of the American Educational Research Association: New York, NY.
- Lederman, J.S., & Holliday, G.M. (2008, March). *Nature of science and scientific inquiry in informal science settings*. Session presented at the annual meeting of the National Science Teachers Association: Boston, MA.
- Lederman, J.S., Lederman, N.G., & Holliday, G.M. (2008, March). *Teaching the nature of science to young children (CESI)*. Session presented at the annual meeting of the National Science Teachers Association: Boston, MA.
- Holliday, G.M., Lederman, N.G., & Lederman, J.S. (2008, March). *Assessing learning that occurs at informal science settings*. Paper presented at the annual meeting of the National Science Teachers Association: Boston, MA.
- Tompkins, A., Holliday, G.M., & Lederman, J.S. (2008, March). *Science in the early education classroom: Formal and informal perspectives*. Session presented at the annual meeting of the National Science Teachers Association: Boston, MA.
- Zilker, I., Holliday, G.M., Kauertz, A., Fischer, H.E., Lederman, J.S., & Lederman, N.G. (2008, April). *Developing a large scale assessment instrument measuring students' competencies in nature of science and scientific inquiry*. Paper presented at the annual international meeting of the National Association for Research in Science Teaching: Baltimore, MD.
- Lederman, G.M., Lederman, J.S., Holliday, G.M., & White, K.J. (2009, April). *Project SLICE: Science learning through inquiry, content, and engagement*. Paper presented at the annual international meeting of the National Association for Research in Science Teaching: Garden Grove, CA.
- Holliday, G.M., Lederman, N.G., & Nieswandt, M. (2009, April). *Museum educators' views about nature of science*. Paper presented at the annual international meeting of the National Association for Research in Science Teaching: Garden Grove, CA.
- Holliday, G.M., Lederman, N.G., & Nieswandt, M. (2009, April). *Museum educators' views about nature of science*. Poster presented at the annual meeting of the American Educational Research Association: San Diego, CA.
- Zilker, I., Holliday, G.M., Kauertz, A., Fischer, H.E., Lederman, J.S., & Lederman, N.G. (2010, March). *A competence test in the field of nature of science and nature of scientific inquiry*. Paper presented at the annual international meeting of the National Association for Research in Science Teaching: Philadelphia, PA.

Holliday, G.M., & Lederman, N.G. (2010, March). *A comparison of views about nature of science among informal science educators and exhibit designers*. Paper presented at the annual international meeting of the National Association for Research in Science Teaching: Philadelphia, PA.

Holliday, G.M., & Lederman, J.S. (2010, March). *Teaching nature of science beyond the classroom*. Workshop presented at the annual national meeting of the National Science Teacher Association: Philadelphia, PA.

White, K.J., Holliday, G.M., & Bartos, S. (2010, March). *Limits on cell size: Tweaking labs to teach about nature of science and scientific inquiry*. Workshop presented at the annual national meeting of the National Science Teacher Association: Philadelphia, PA.

Holliday, G.M., Kinser, B.P., Maxwell, K., & Pappas, J. (2011, March). *Synergy: Bringing biology, ecology, and technology together*. Workshop presented at the annual national meeting of the National Science Teacher Association: San Francisco, CA.

Antink, A.L., Holliday, G.M. (2011, March). *Incorporating problem based learning and creativity in integrated science classrooms: An international perspective*. Workshop presented at the annual national meeting of the National Science Teacher Association: San Francisco, CA.

Holliday, G.M., Lederman, J.S., & Lederman, N.G. (2011). *Content related social interactions during professional development at an informal science institution*. Paper presented for the annual international meeting of the National Association for Research in Science Teaching: Orlando, FL.

Zilker, I., Holliday, G.M., Kauertz, A., Fischer, H.E., Lederman, J.S., & Lederman, N.G. (2011, April). *Assessing understanding about nature of science in historical contexts*. Paper presented for the annual international meeting of the National Association for Research in Science Teaching: Orlando, FL.

Regional and State

Meyer, E.C., Kennally, K., Zika-Beres, E., & Holliday, G. (1993) *Sibling support and visitation in the neonatal intensive care unit*. Poster presented at the Florida Conference on Child Health Psychology: Gainesville, FL.

Holliday, G., Meyer, E.C., Kennally, K., & Zika-Beres, E. (1993) *Sibling support and visitation in the neonatal intensive care unit*. Paper presented at the Northern New England Regional Conference of the Association for the Care of Children's Health: Boston, MA.

Holliday, G. (1995) *Whole science*. Session presented at the Rhode Island Teachers Applying Whole Language (TAWL) Conference: Cranston, R.I.

Holliday, G.M. (2008). *Assessing learning that occurs at informal science settings*. Paper presented at the Illinois Institute of Technology, Chicago, IL.

Holliday, G.M. (2009). *Informal Science Institutions (ISIs) have been recognized for providing quality professional development for K-12 classroom teachers (NSTA, 1998). However, what is the current ISI professional development model and is this model adequate for the needs of K-12 classroom teachers?* Paper presented at the Illinois Institute of Technology, Chicago, IL.

Holliday, G.M. (2009). *Museum educators' views about nature of science*. Paper presented at the Illinois Institute of Technology, Chicago, IL.

Holliday, G.M. (2010). *Professional development at an informal science institution: Its impact upon elementary and middle school teachers' learning of science content and their content related social interactions (Dissertation Proposal)*. Paper presented at the Illinois Institute of Technology, Chicago, IL.

Review Responsibilities

2005	Reviewer, NARST Annual Meeting, Strand 4, "Pre-service Teacher Education,"
2007-present	Reviewer, NARST Annual Meeting, Strand 6, "Science Learning in Informal Contexts".
2008-present	Reviewer, <i>International Journal of Science Education</i> .
2009-present	Reviewer, NARST Annual Meeting, Strand 8, "In-service Science Teacher Education".
2010	Reviewer, NARST Annual Meeting, Strand 13, "History, Philosophy, and Sociology of Science
2010	Reviewer, AERA Annual Meeting, Division C, "Learning and Instruction"
2010	Reviewer, <i>International Journal of Science and Mathematics Education</i> .

Professional Activities

Contributor, Write It \ Do It Event, Rhode Island Science Olympiad, Rhode Island College (1996-2000)

Council for Elementary Science International workshop presenter at NSTA, 2008 "Make-and-Take"

Presider, Global Conversations in Science Education Conference during the 2011 NSTA National Conference (San Francisco, March)

Membership in Academic, Professional, and Scholarly Societies

American Association for the Advancement of Science (AAAS)

American Association of Colleges in Teacher Education (ASTE)

American Education Research Association (AERA)

European Science Education Research Association (ESERA)

National Association for Research in Science Teaching (NARST)

National Science Teachers Association (NSTA)

Member, Heritage Harbor Museum Special Events Committee, Providence (1998)

Member, Museum Alliance of Providence, Providence (1996)