# Karen Elizabeth Carney

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## Education:

**Northwestern University** ***PhD in Learning Science expected June 2004***
Advisor, Kenneth D. Forbus
Cognitive Science Fellowship 1999-2000

**Oberlin College** ***B.A. 1992, Geology***
Elected to the society of Sigma Xi, Spring 1992.

## Research:

### Interests:

- The nature, construction, and use of scientific knowledge
- Student learning and reasoning about scientific phenomena
- Interaction between student learning and computational or representational tools and their impact on reasoning and learning
- Design of technology to further student learning

### Thesis:

My thesis addresses three interrelated questions around design of a student modeling tool. What skills and supports are needed for students to become proficient modelers? How do students appropriate and use a modeling formalism to express their understandings about science content? Can modeling help students build on prior knowledge?

## Research Activities and Experience:

**Northwestern University,** ***1998 - present***

### Design of technology and curricula:

- Designed *Vmodel* modeling software for middle school students.
- Co-designed modeling-infused curriculum about Mars colonization with teachers from Chicago Public Schools.
- Co-developed ecosystem simulation software, designed and developed supporting materials for its use in classrooms.
- Designed and developed hypertext about space exploration for use in NASA-supported outreach materials.
- Co-developed solar house simulation software.

### Implementation of technology infused curricula in Urban Classrooms:

- Implemented or co-taught multiple iterations of curricula and software in Chicago Public Schools classrooms.
- Co-led, with Chicago Public Schools teachers, teacher-training seminars about use of curricula and software.

### Evaluation of student outcomes:

- Observed student discussions and activities during curricular enactment
- Designed and conducted Individual and group clinical interviews, Analyzed interviews.
- Designed and implemented pre- and post- tests and other classroom based assessments
- Evaluated student models and other work products, developed profiles of student modeling and thinking

**Oberlin College** ***1991 - 1992***

**Lab Assistant**

Analyzed origin of potential biogenic structures in Precambrian sedimentary rock

**Field Researcher**

Analyzed patterns of leaf fall and decay in modern forests in order to make inferences about the leaf fossil record

## Professional Teaching and Educational Design Experience:

**Northwestern University** ***1999 - 2004***

Instructor:

- *Learning and Understanding, a Cognitive Science Approach*, (Undergraduate cognitive science) winter '02.

Co-Instructor:

- *Teaching with Technology workshop* Golden Apple Alternative Teacher Certification program, summer '00.
- *New Approaches in Science Teaching* (Master's in teaching program) Winter '01

Teaching Assistant:

- *Learning and Understanding* (Undergraduate cognitive science) Winter '00),
- *Teaching with Technology* (Master's in teaching program) Spring '99,
- *Design of Learning Environments* (Graduate educational design) Winter '99,
- *Design of Learning Environments*, (Master's in teaching program) Winter '04

**Collegiate School, New York, New York** ***1993 - 1997***

Classroom teacher and curriculum developer:

- 6th grade Earth Science
- 1st and 4th grade general science
- High school geology.

**Lamont-Doherty Earth Observatory of Columbia University** ***1996, 1997***

Developed school activities to accompany *EarthView* Software

**Thames Science Center, New London CT** ***1992- 1993***

Developed and taught classes for visitors, taught in school outreach, teacher in-service programs.

## Publications and professional presentations

### Publications


Carney, Karen, (in prep) Helping Students to become Modelers: What it Takes. Insights from Design into the Task of Modeling.

Carney, Karen, Ureel, Leo, (2003) "Demonstration of Supports for Student Reuse and Integration of Knowledge Through Modeling" In Wasson B., Baggetun, R., Hoppe, U., Ludvigsen, S. (Eds.) International Conference on Computer Support for Collaborative Learning, CSCL 2003, Community events, Communication and Interaction. (pp. 181-182) Bergen, Norway, University of Bergen Press.

Ureel, Leo, Carney, Karen (2003) "Design Of Computational Supports For Students in Visual Modeling Tasks" In Wasson B., Baggetun, R., Hoppe, U., Ludvigsen, S. (Eds.) International Conference on Computer Support for Collaborative Learning, CSCL 2003, Community events, Communication and Interaction. (pp. 98-100) Bergen, Norway, University of Bergen Press.

Carney, Karen, (2002) “When is a Tree a Process? Influences on Student Representations of Process in ‘Low Floor’ Qualitative Modeling Tasks.” In. P. Bell and T. Satwicz (Eds) *Keeping Learning Complex: The proceedings of the Fifth Annual International Conference of the Learning Sciences*, (pp. 49-56) Mahwah, NJ: Lawrence Earlbaum.

Forbus, K, Carney, K, Harris, R, Sherin, B. (2001) “Modeling Environment for Middle-School Students: a Progress Report.” In G. Biswas (ed.) *Papers from the 2001 Qualitative Reasoning Workshop* Stoughton, WI, The Printing House.

Reiser, B.J., Spillane, J.P., Steinmuller, F., Sorsa, D., Carney, K., & Kyza, E. (1999) "Investigating the Mutual Adaptation Process in Teachers’ Design of Technology-infused Curricula." In B. Fishman & S. O'Connor-Divelbiss (Eds.), *Proceedings of the Fourth International Conference on Learning Sciences* (pp. 342-349). Mahwah, NJ: Erlbaum.

Simonson, B. M., and Carney, K., (1999) "Roll-Up Structures: Evidence of *in Situ* Microbial Mats in Late Archean Deep Shelf Environments," *Palaios*, v. 14, p. 13-24.

Simonson, B.M., and Carney, K., (1997) "Roll-up Structures: Evidence of Microbial Mats Living in Deeper Water Environments during the Early Precambrian." *Geological Society of America Abstracts with Program*, v. 29, p. A-193.

Meldahl, K., Scott, D., Carney, K. (1995) "Autochthonous Leaf Assemblages as Records of Deciduous Forest Communities: An actualistic study." *Lethaia(28)*

## Presentations and other Professional activities

Carney, K, and Strobel, J. (Accepted) “Beyond System Dynamics—Educational Applications and Benefits of Modeling as a Specialized Representational Practice” Symposium, accepted for American Educational Research Association annual conference, April, 2004.

Carney, K (Accepted) “Using System Modeling to Promote Abstraction and Transfer, Design and Preliminary Results.” Accepted for American Educational Research Association annual conference, April, 2004.

Carney, K. (2002) “Dealing with Unexpected Results in Design Research--Methodology, Redesign, Drawing Conclusions” (doctoral consortium presentation) *International Conference of the Learning Sciences*, Seattle, Washington, 2002

Carney, K, Forbus K., Ureel, L., Sherin, B. (2002) “Using Modeling to Support Integration and Reuse of Knowledge in School Science: *Vmodel*, a New Educational Technology.” American Educational Research Association annual conference, April, 2002.

Forbus, K., Sherin, B., Carney, K. and Harris, R. (2000) “Explanation: The Missing Leg” (invited presentation) *NSF Workshop on Modeling and Visualization*, Washington, DC.

Carney, K, and Kalathil, R. (2000) "Student Modeling in Science: Influences of Prior Experience with Representational Norms" Presented at the Apr. 2000 meeting of the American Educational Research Association, New Orleans, April, 2000

Carney, K. and Meldahl, K., (1992) “Paleoclimate Implications of Leaf Taphonomy: An Actualistic Study." Presented at the meeting of The Geologic Society of America, Cincinnati, OH.