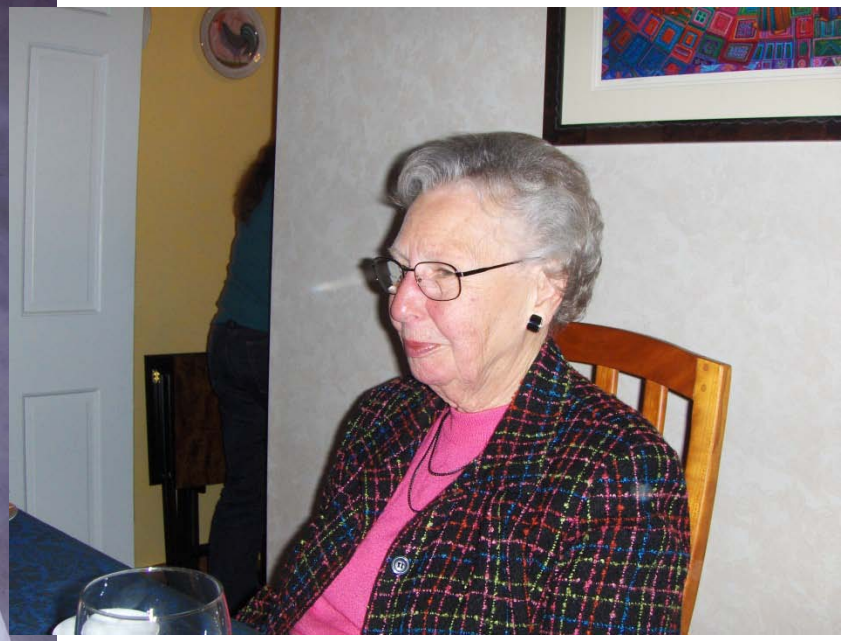
MALLINSON INSTITUTE FOR SCIENCE EDUCATION 2011

Western Michigan University

George and Jackie Mallinson



2011 MISE Distinguished Alumnus

Mary Lindow

Battle Creek Area Mathematics and Science Center

Who are MISE faculty and Staff?

- Marcia Fetters, Science Teacher Education
- Brandy Skjold, Faculty Specialist
- William Cobern, Science Education (Biology)
- Renee' Schwartz, Science Education (Biology)
- David Rudge, History & Philosophy of Science (Biology)
- Leonard Ginsberg, Biological Sciences
- Joe Stoltman, Geography Education
- Heather Petcovic, Geosciences Education
- Charles Henderson, Physics Education
- David Schuster, Physics Education
- Megan Grunert, Chemistry Education
- Mary Anne Sydlik, SAMPI Director
- Heather White, Office Coordinator
- Betty Adams, Laboratory Coordinator

Funded projects

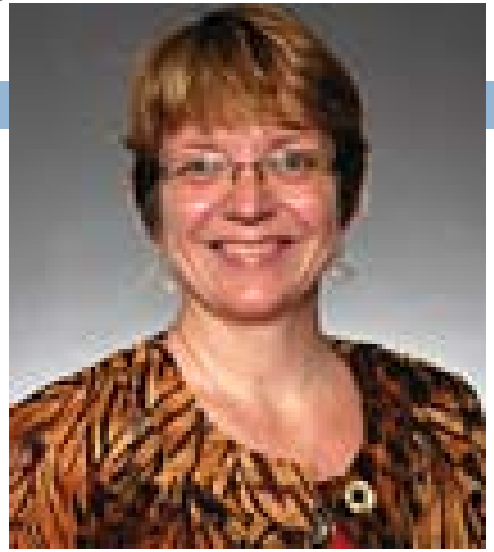
- W.K. Kellogg Foundation's Woodrow Wilson Michigan Teaching Fellowship (Co-Directors: **Fetters,** Mingus)
- NSF CCLI [**Schwartz, Ginsberg,** Geiser, Schreiber] Engaging intro level BIOS and CHEM students through laboratory investigations
- NSF Geoscience Education (**Petcovic,** Koretsky, Rowbotham) - *Development and evaluation of a problem-based, field and laboratory environmental geochemistry course.*
- NSF-REESE (**Petcovic,** Baker, Callahan) - *Collaborative Research: Learning across the Novice-Expert Continuum: Cognition in the Geosciences.*
- NSF (**Henderson,** Cole, Froyd) *Collaborative Research: Increasing the Impact of TUES Projects through Effective Propagation Strategies: A How-To Guide for PIs.*
- NSF (**Henderson,** M. Borrego, PI, M. Prince) Collaborative Research: Use and Knowledge of Research-Based Instructional Strategies (RBIS) in Engineering Science Courses
- NSF (M. Dancy, **Henderson**) *Collaborative Research: From Dissemination to Adoption: A Study of the Instructional Change Process in Faculty Most Likely to Succeed*
- NSF (**Henderson,** M. Dancy) *Understanding Instructor Practices and Attitudes Towards the Use of Research-Based Instructional Strategies In Introductory College Physics*
- NSF S-STEM (**Cobern** et al.)
- HHMI (**Henderson**) *Assessing the Impact of the Iowa State HHMI Project*
- HHMI ExpeRTS program [Stapleton, **Schwartz, Ginsberg, Cobern**] *Secondary science ed majors to experience research and inquiry teaching*
- American Association of Physics Teachers (**Henderson**) *Physics Education Research Funding Census, Physics Education Research Leadership and Organizing Council*
- MiTEP (**Petcovic**) *Workshop for K-12 teachers; focused on enhancing earth science content knowledge through local field trips.*

William Cobern

- Director of MISE
- Fulbright Fellowship at Sakarya University in Turkey
- Main research interest:

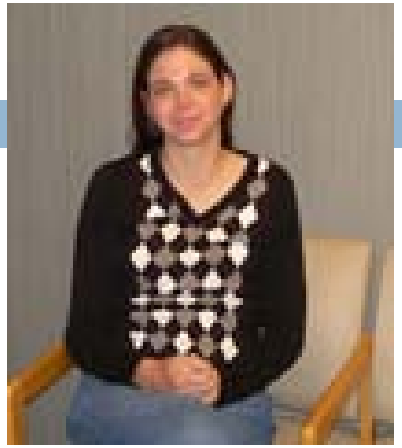
  worldview and cultural studies in science
- Many projects including:
  - NSF: Experimental study of effects of inquiry vs direct instruction on 8th grade students
  - NSF: Developing an assessment for knowledge of inquiry science pedagogy

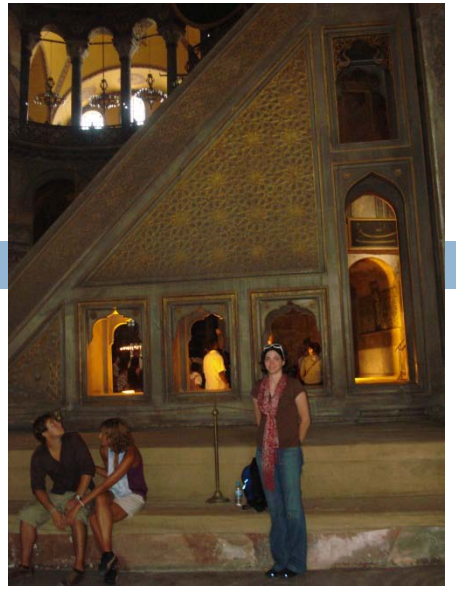
Marcia Fetters



- Research interest: Science teacher education, learners with special needs
- Recent work: Co-Director of the *W.K. Kellogg Foundation's Woodrow Wilson Michigan Teaching Fellowship*
- Teaching: Secondary science methods; Curriculum

Brandy Skjold





- Laboratory instruction specialist
  - Helps design, organize, coordinate, teach, do research, and ensure the laboratory courses are running as smoothly as possible.
  - Coordinated and taught graduate student orientation
- Research interests include:
  - Use of language in college science teaching and research contexts.
  - Works on many funded projects
- Recent work includes:
  - Participation in numerous conferences, including a most recent ESERA conference in Lyon, France. She and Dr. Schwartz presented a paper on use of models and modeling in an undergraduate biology course.

Renee' Schwartz

- Research interests: Nature of science and scientific inquiry
- Recent publications include:
  - Book chapter: The nature of scientists' NOS views (in press)
  - Book chapter: Multiple representations in biology: Photosynthesis and Cellular Respiration (in press)
  - **Schwartz, R.**, Lederman, N., & Abd-El-Khalick, F. (accepted). A series of misrepresentations: A response to Allchin's whole science. *Science Education*
- Recent work includes:
  - Board member of NARST
  - ESERA conference in Lyon, France.
  - PI on NSF grant, co-PI on HHMI grant working with future high school science teachers
- Teaching
  - *Cell and molecular biology for future teachers*
  - *Teaching and learning in the college science classroom*
  - *Research traditions: two semester sequence*
  - *Inquiry and Nature of Science*

David Rudge

- Research interests: Studies of the role HPS can play in science learning
- Recent publication includes:
  - **Rudge,** D.W. (2010) Tut-tut Tutt, Not so Fast: Did Kettlewell Really Test Tutt's Explanation of Industrial Melanism? *History and Philosophy of the Life Sciences* .
- Recent work includes:
  - Past-president IHPST
  - IHPST conference presentations: Greece and Brazil
  - Had 4 poster presentations co-authored with MISE Graduate students
- Teaching:
  - *Biology for future K-8 teachers*
  - *History and Philosophy of science*
  - *Several online courses for MA program*

Len Ginsberg

- Research interest: Learning and retention of first year STEM majors
- Recent work includes
  - Co-PI on NSF CCLI project for BIOS and CHEM students
  - Co-PI on HHMI project for secondary ed majors
- Teaching
  - *BIOS 1500: Introductory biology for majors*
    - exploring ways of increasing readiness of students for learning science.

Joe Stoltman

- Research interest: Geographic education
- Recent work includes:
  - Lecture tour in Italy
  - Lots of travel… gotta love being a geographer!
- Teaching
  - *Geography*
  - *Geography and social studies teaching methods*

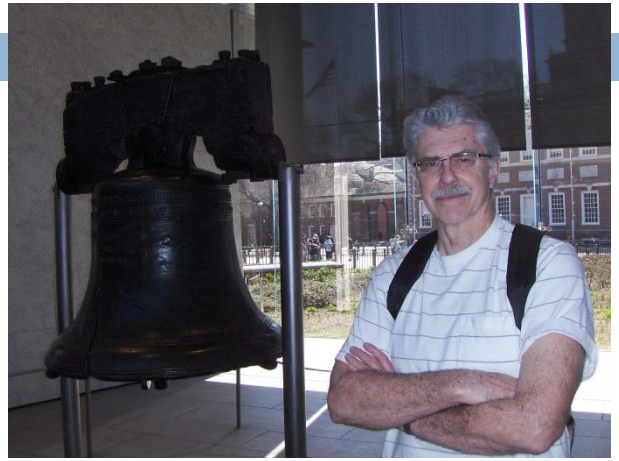
Heather Petcovic

- Research interests: Geosciences education; cognition
- Recent publications:
  - **Petcovic**, H.L., Fynewever, H., **Henderson**, C., **Mutambuki**, J.M., and **Barney**, J.A., in press, Faculty grading of quantitative problems: A mismatch between values and practice: *Research in Science Education*.
  - Hambrick, D.Z., Libarkin, J.C., **Petcovic**, H.L., Baker, K.M., Elkins, J., **Callahan**, C., Turner, S., Rench, T.A., and LaDue, N., in press, A test of the Circumvention-of-Limits hypothesis in scientific problem solving: The case of geological bedrock mapping, *Journal of Experimental Psychology: General*.
- Recent work includes: Montana and Woods Lake projects

Charles Henderson

- Research interests: Physics education; Faculty change in higher education STEM
- Recent publications:
  - **C. Henderson**, A. Beach and N. Finkelstein, (2011). Facilitating change in undergraduate STEM instructional practices: An analytic review of the literature, *Journal of Research in Science Teaching*.
  - **Petcovic, H.**, Fynewever, H., **Henderson, C.**, **Mutambuki, J.**, & **Barney, J.** (accepted) Faculty Grading of Quantitative Problems: A Mismatch between Values and Practice, *Research in Science Education*.
  - **Henderson, C.**, Beach, A., & Finkelstein, N. (accepted) Four Categories of Change Strategies for Transforming Undergraduate Instruction, submitted September 2009 to *Transitions, Transformations and Transgressions in Learning and Education*, edited by Päivi Tynjälä, Marja-Leena Stenström & Marjatta Saarnivaara.
- Recent work includes:
  - NSF grant National Science Foundation, "Collaborative Research: Increasing the Impact of TUES Projects through Effective Propagation Strategies: A How-To Guide for PIs"
  - Several additional funded projects in PER
  - Several presentation at AAPT
  - Editor of the Physics Education Research section of *American Journal of Physics*

David Schuster



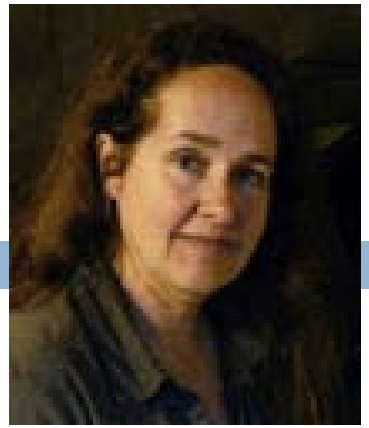
- Research interest includes: Physics education
- Recent work includes:
  - NSF: Experimental study of effects of inquiry vs direct instruction on 8th grade students
  - NSF: Developing an assessment for knowledge of inquiry science pedagogy
  - Several presentations at the recent AAPT conference and IHPST conference
- Teaching:
  - Physics for future K-8 teachers

Megan Grunert

- Research interests: Chemical education
  - Understanding and promoting diversity in chemistry
- Recent work:
  - She has hit the ground running, working with four MISE graduate students!
  - Developing problem-based lab units to be incorporated into the general chemistry laboratory courses
- Recent publications:
  - *Chemical Education Research and Practice*
  - *Science Education International*
- Teaching:
  - Coordinating the first year chemistry

Betty Adams

- Laboratory coordinator
- Works on many funded projects
- Engineering & physics
- Helps with EVERYTHING!

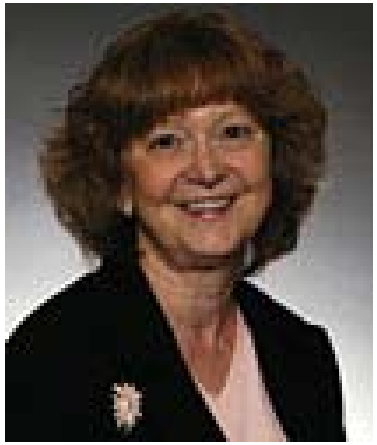


Heather White

- Office Coordinator
- Communications
- We cannot live without her!

Mary Anne Sydlik

- Director of SAMPI
- Many funded projects
- Lead investigator on national, statewide, and local educational improvement efforts



Some of our students…

Caitlin Callahan: Exploring the nature of geologic expertise (Petcovic)

"We are looking at how geologist with different levels of expertise solve a field-based problem such as making a geologic map."

- Field study in Montana and British Columbia
- Studying inquiry-based teaching about the interior of the Earth
- Presenting her work at the GSA conference

Kelly Sparks: undergraduate students', especially non-science majors, conceptions of learning and approaches to learning.

Presentation: *Students' conceptions of learning and approaches to learning in physical Geography.* Presented at the Q Conference, Birmingham, England. September, 2011.

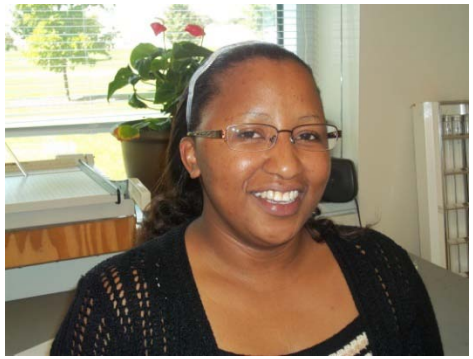
Some of our students….

Ramón Barthelemy: social justice with respect to equity in education

S-STEM Improve Fellowship and NSF AGEP Fellowship

- Current Research:
  - Perceptions and bias in the hiring of physics faculty
  - Career perceptions of male and female physics graduate students.

Jacinta Mutambuki:



Current Research:

> GTAs Professional Development in Adopting Inquiry-Based Strategies in Teaching STEM (Chemistry-Biology) Labs. (with Dr. Schwartz)

> Integrating Nanoscience and Nanotechnology Concepts into Chemistry Curriculum: Authentic Learning. (with Drs. O'bare and Grunert)

Presented a poster "*Faculty Beliefs and Grading Practices on Quantitative Problem-Solving across Physics, Chemistry, and Earth Science Disciplines*" during the 38th National Organization for Black Chemists and Chemical Engineers (NOBCChE), Houston, Texas; April 2011.

Some of our students…

William Mamudi

Current research: studying the disparity between teaching beliefs and actual practices from physics instructors (physics teachers, TAs, faculty), (with Dr. Henderson).

Won 2009 AMINEF Opportunity Initiative Grant from US Secretary of State.

Presentation at the 2011 American Association of Physics Teachers and 2011 Physics Education Research Conference in Omaha, Nebraska

"Outside my formal research, I'm interested with Confucian idea in education how it has influenced Asian society in general."

Chaiphat Plybour

Research interest: formative assessment

"I am interested in improving students' achievement and attitude toward teaching and learning in Physics 1800 course by using formative assessment, including sharing objectives and assessment criterions, peer-and self-assessment, and feedback activity, into the lesson, especially in Newton's first and second law."

Some of our students…

- **Amy Bentz:** NSF Assessment for Learning

  "My research involves the investigation of pre-service teachers' perceptions of formative assessment: both in their understanding of formative assessment and their use of formative assessment in hypothetical classroom scenarios."

  - Also involved with other funded projects and teaching a course: *Instructional Design and Methodology in Secondary Education.*
  - Presented at several conferences

Andrea Bierema : studying upper-level biology students' conceptions of the term 'animal' (Working with Dr. Schwartz)

- She has also assisted Charles Henderson, Heather Petcovic, and Herb Fynwever with their study on local impacts of national Advanced Technological Education (ATE) centers on their host institutions.

Poster presentations (with Dr. Rudge) at the 2011 IHPST conference. "*Teaching the nature of science concept of multiple methods in science and the ecological concept of character displacement using a historical episode*"

Some of our students….

- **Cathy Northcutt:** science teacher education
  - HHMI ExpeRTS program: helping coordinate, run, and research effects of science research experiences, support features, and teaching practicum on preservice teachers' views of NOS, NOSI, and teaching practices. (with Dr. Schwartz)

- **Tammy Coleman:** Informal science education and the effect of emotion on perceived learning

Teaches at Lowell High School and GRCC

Leads workshops and takes college students and educators on study abroad trips to learn about natural history of an area with place-based education.

- **Lloyd Mataka:** Physics education
  - Effects of an explicit problem-solving strategy in undergraduates' abilities to solve heat transfer problems (with Dr. Cobern)

- **Robert Kagumba:** Examining the knowledge base of science teacher educators' with respect to inquiry, inquiry teaching, and nature of science.

Some of our newest students…

- Joe Lane: Geography education
- Aekam Barot: "Investigating Students Time Outside the Classroom" (with College of Engineering and Applied Sciences)
- Carol Paxhia: W.K. Kellogg Foundation-Woodrow Wilson Michigan Teaching Fellowship Program (with Dr. Fetters)
- Chris Duchesneau: Biology education
- Cody Williams: SAMPI
- Raina Khatri: Physics education

Some more of our students….

- Jeffrey Barney
- Aparna Sharma
- Sarah Krajewski
- Matthew Ludwig
- Leah Cook
- Phyllis Pennock
- Kate Rowbothom
- Rex Taibu
- Gunkut Mesci
- Selcuk Sahingoz
- Jennifer Porter
- Donya Dobbin
- Kathleen Quardokus
- Kelley Becker
- Vance Kincaid
- Janice Fulford
- Steve Podewell
- Kimberly Kibby
- Hang Hwa Hong
- David Cassidy

Some recent MISE graduates

MISE courses

- Biology

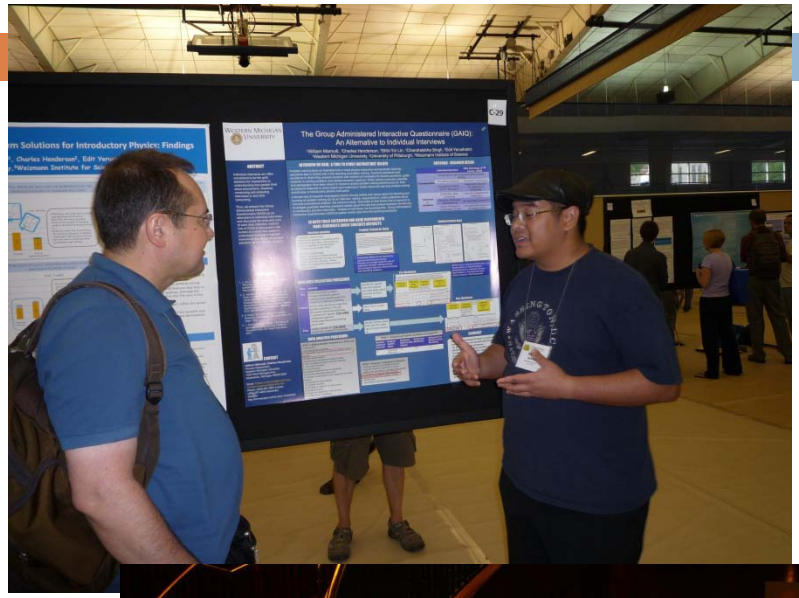
MISE courses

- Geology and Geography

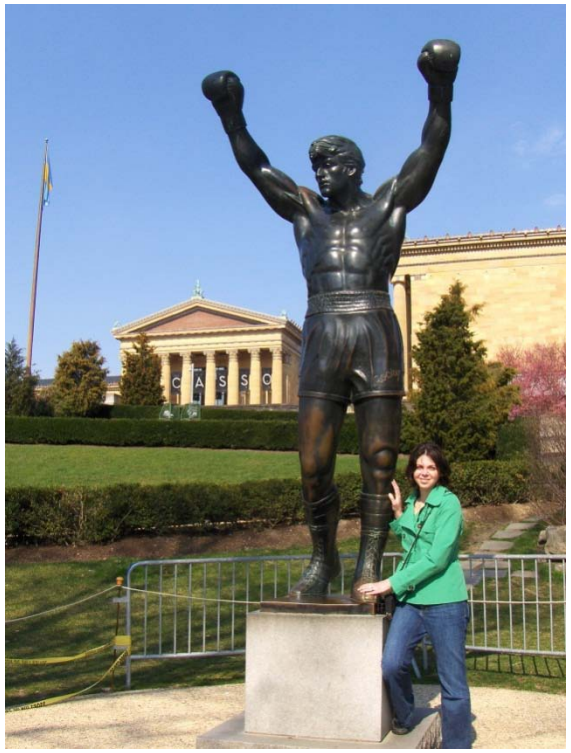
MISE courses

- Physics

Conference Fun (and work)




PLANET EARTH




Faculty Beliefs and Grading Practices on Quantitative Problem-Solving across Physics, Chemistry, and Earth Science Disciplines

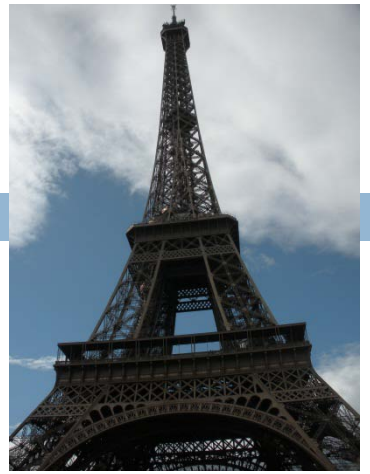

B.B. BLUES BAR

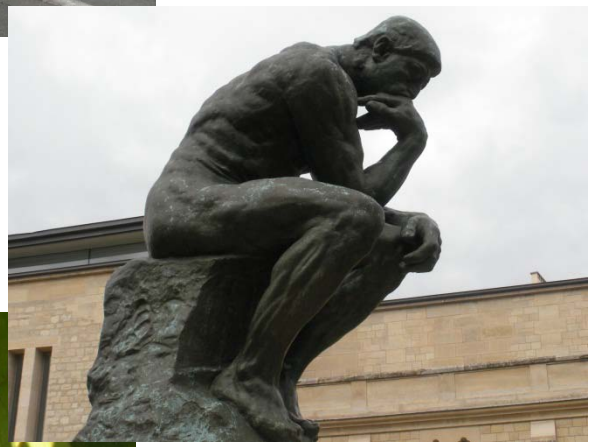

EXIT

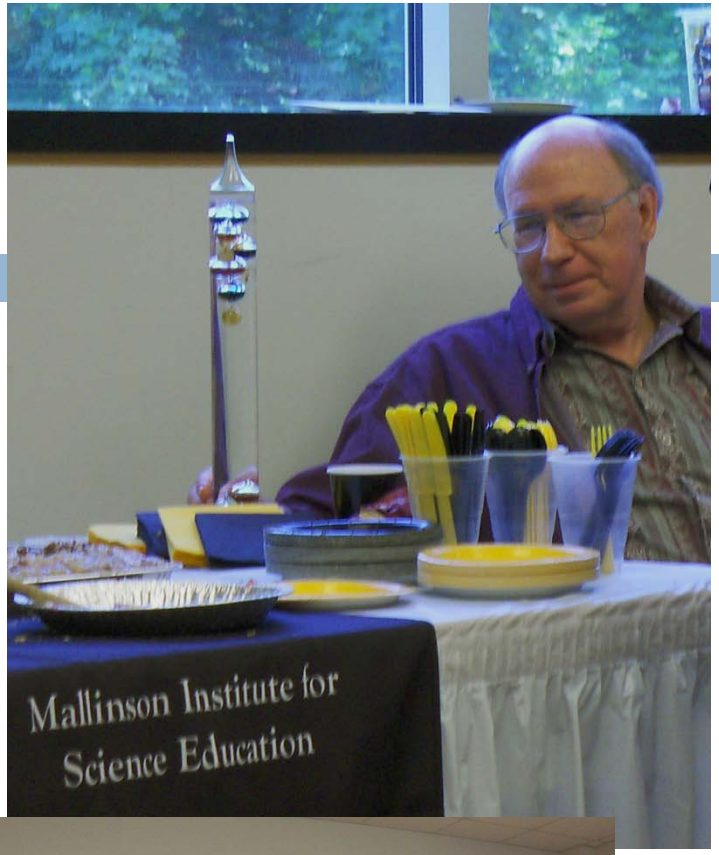

HILF
NEW
IGER
YORK

Travel abroad….


VILLE DE
LYON



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