

Matthew D. Covington

NSF Earth Sciences Postdoctoral Fellow

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Education:

University of California, Santa Cruz, 2002 – 2008

PhD. in Physics

Advisor: Prof. Joel Primack

Dissertation: “The production and evolution of scaling lows via galaxy merging”

University of Arkansas, Fayetteville, 1998 – 2002

B.S., Physics, Summa Cum Laude

B.A., Philosophy, Summa Cum Laude

Professional Positions:

National Science Foundation International Research Fellow

Karst Research Institute, Slovenia – Future (2010-2012)

National Science Foundation Earth Sciences Postdoctoral Fellow

University of Minnesota – Twin Cities, 2008 – 2010

Research Experience:

- Analytical and numerical analysis of flood pulses through karstic aquifers, and how they are a function of system geometry.
- Deployment of a network of field data loggers for use in studying flood pulses through karstic aquifers.
- Developing quantitative conceptual frameworks for understanding processes in karst aquifers and glacial hydrology
- Examinations of hydrodynamics simulations of galaxy mergers and construction of predictive models of the merger remnants and merger process.
- Comparison of simulated galaxy merger remnants with observational relations.

Cave-Related Experience:

- Serving as Vice Chair (2005-2008) of the San Francisco Bay Chapter of the National Speleological Society.
- Worked with the Cave Research Foundation to help set up a hydrological monitoring system at Lilburn Cave, CA.
- Aided in the first extensive survey of the subterranean biota of Arkansas, 2002-2004.
- Served as Vice Chair (2001) and Chair (2002) of the Boston Mountain Grotto
- Participated in numerous cave exploration and mapping expeditions in Alaska, Sumatra, Peru, Mexico, Svalbard, and Lechuguilla Cave (New Mexico), and Jewel Cave, 1999-present

Teaching and Outreach:

- Developed presentations on cave science and exploration given to a number of elementary school, middle school, high school, and college students about cave science and exploration
- Gave public talks combining stories of cave exploration and a message about the importance of cave and karst aquifer conservation
- Led a cave field trip for a cave ecology summer camp at the Ozark Natural Science Center
- 2008-2009, taught guest lectures: one in a geomorphology course (U.C. Santa Cruz), two in a karst hydrogeology course (U. of Arkansas), and three in a fluid mechanics in earth science course (U. of Minnesota).
- 2006-2007, TA experience: taught introductory labs for Electromagnetism and Thermodynamics and Fluid Mechanics.
- 2007, Designed and taught a course on beginning vertical caving for the Stanford Outdoor Education program.

- 2006 – 2008, Instructor in the Stanford Outdoor Education program.
- 2005 – 2008, head of the training program for the San Francisco Bay Chapter of the NSS.

Awards and Fellowships:

2010 – 2012, National Science Foundation International Research Fellowship
 2008 – 2009, National Science Foundation Earth Sciences Postdoctoral Fellowship
 2008, University of California Santa Cruz Physics Department Dissertation year fellowship.
 2006 – 2007, Lawrence Livermore National Lab-Institute for Geophysics and Planetary Physics Graduate Fellowship
 2002 – 2005, NSF Graduate Research Fellowship
 2002, University of Arkansas's 2002 Phi Beta Kappa Distinguished Scholar
 1998 – 2002, University of Arkansas Chancellor's Fellowship
 1998 – 2002, Distinguished Governor's Scholarship
 1998 – 2002, National Merit Scholarship
 1998, Eagle Scout Award
 1998, National Merit Finalist

Professional Memberships and Service

Service

Fall AGU Meeting, 2009, Organized and co-chaired karst and fractured hydrology session
 North-Central/South-Central Section GSA meeting, 2010, co-organizing speleology session

Memberships

Geological Society of America
 American Geophysical Union
 National Speleological Society
 Minnesota Ground Water Association

Publications

Luhmann, A., Covington, M., Peters, A., Alexander, S., Cale, A., Green, J., and Alexander, E., "Thermal Patterns of Karst Springs and Cave Streams in Southeastern Minnesota", accepted pending minor revision, *Groundwater*.
 Covington, M.D., Wicks, C.M., and Saar, M.O., "A Dimensionless Number Describing the Effects of Recharge and Geometry on Discharge from Simple Karstic Aquifers", *Water Resources Research*, 45, W11410, doi:10.1029/2009WR008004, 2009.
 Covington, M., Kassin, S., Dutton, A., Weiner, B., Cox, T. J., Primack, J., Faber, S., and Koo, D., "Evolution of the Stellar-Mass Tully-Fisher Relation in Disk Galaxy Merger Simulations," in press, *Astrophysical Journal*.
 Covington, M., Cox, T. J., Jonsson, P., Primack, J., & Dekel, A.. 2008, "Predicting the Properties of the Remnants of Dissipative Galaxy Mergers," *Monthly Notices of the Royal Astronomical Society*, 384, 1, 94-106.

In Preparation

Covington, M.D., Luhmann, A., Wicks, C.M., and Saar, M.O., "Process length scales in karst aquifers," in preparation
 Covington, M.D., Banwell, A.F., Gulley, J., Saar, M.O., Wicks, C.M., Willis, I. and N. Arnold, "Determining the effects of recharge versus system geometry on proglacial hydrograph form," in preparation
 Covington, M., Dekel, A., Primack, J., Cox, T.J., Somerville, R. and Croton, D., "A semi-analytic model for the evolution of galaxy scaling relations via merging," in preparation.

Popular

Covington, M., "J2: The Journey to Camp 4 – Beyond the Sump," *NSS News*, January, 2010.
 Covington, M., Minton, M., "How to make a major cave connection in two weeks, or The shifting sands of time," *Association for Mexican Cave Studies Activities Newsletter*, 31, 2008.

Presentations

Oral

- Covington, M.D., Wicks, C., and Saar, M.O., "Thermal signals as a means of characterizing karst aquifers," *Eos Trans. AGU, Fall Meet. Suppl.*, 2009.
Louisiana State University, *Geology and Geophysics Department Seminar*, September, 2009
University of Arkansas, *Geoscience Department Seminar*, October, 2009
"Stellar-Mass Tully-Fisher Relation Evolution in Galaxy Merger Simulations," August 2007, *Santa Cruz Galaxy Formation Workshop*.
"Predicting Sizes of Merger Remnants," August 2006, *Santa Cruz Galaxy Formation Workshop*

Cave Exploration

- "Arduous exploration in one of the worlds deepest cave systems," *Outdoor Adventure Expo*, Minneapolis, November 2009. (This talk also given as a public lecture at the University of Arkansas, and a student talk at LSU)
"J2 2009: Beyond the Sump," *International Congress of Speleology*, breaking news talks
"2007 Huautla Expedition: Connecting Rio Iglesia to Sistema Huautla,"
Co-presented with Mark Minton, July 2007, *National Speleological Society Convention: International Exploration Session*
"High and Low Places in Lechuguilla Cave," May 2007, *Stanford Alpine Club*
"Caving at High Altitude in the Peruvian Andes," July 2005, *National Speleological Society Convention: International Exploration Session*
"Gunung Ngalu Seribu, Sumatra: Mountain of 1000 Caves," July 2001, *National Speleological Society Convention: International Exploration Session*

Poster

- M.D. Covington, S.D.C. Walsh, C.M. Wicks, and M.O. Saar, "Modeling the Effects of Variable Recharge and Conduit Geometry on Flow Through Karstic Aquifers," *Eos Trans. AGU, Fall Meet. Suppl.*, 2008.
Covington, M.D., Wicks, C., and Saar, M., "What's in a spring hydrograph?" *Portland GSA Annual Meeting*, 2009.
Poster, "Predicting the Properties of the Remnants of Galaxy Merger Simulations," May 2007, *Chamonix 2007 conference: Structure Formation in the Universe*.