Understanding Interactions within the LTER Network for Improved Collaboration: Final Report

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Call For Proposal: *Call for Proposals for 2011 LTER Synthesis and Training Working Groups*
Type: *Synthesis*
Year: *2011*
Lead PI: *Robert Christian, rchristian*
Site: *Virginia Coast Reserve LTER*
Total Budget: *$13,000*
Participants: *Robert R. Christian, Biology Department, East Carolina University, Greenville, NC 27858 (christianr@ecu.edu; 252-328-1835)(VCR LTER)*
(Co-PIs with expertise in social network analysis: Jeffrey C. Johnson, East Carolina Univ.; Steven Jackson, Cornell U.; Shawn Dalton, Thrive Consulting, BES)
(Graduate students: Caleb Hickman, Univ. Wisconsin; John Haywood, East Carolina Univ.)
(LNO support with information management: Robert Waide and James Brunt, U. New Mexico)
(Participating scientists with expertise in network science: Julia Melkers, Georgia Tech; Theresa Velden, Cornell U.)

This effort was designed to "stimulate cross-site and Network-level synthesis" by addressing issues of collaboration within the LTER network. We extended a previous working group study to identify and quantify potential mechanisms that have fostered collaboration and network evolution. The previous study provided one of the most complete studies of the nature of collaboration within the LTER network (Johnson et al. 2010).

Study
Schedule of Activities:
Summer and fall 2011: organization of bibliographic information, initial analyses.
November 2011: Workshop
March 2012: Presentation at Sunbelt conference on social network analysis.
September 2012: Intentions for interviews of LTER scientists on nature of collaborations at ASM.

Products
We attempted to address our goals through analysis of the LTER bibliographic database, records available at the Network Office, and selected publications. The most complete and validated database of publications for the LTER was developed for the previous study and covers 1981 through 2006. We solicited updates on publications from individual LTER sites for more recent years through the LTER Network Office. **One product is therefore an update to the network bibliography since 2006.**

The previous study focused on inter-site collaborations, and the database actually used for analysis did not include authors. This project required reinsertion of author names into the dataset. This step demonstrated problems with the original dataset, and these were corrected, primarily for inter-site publications. Furthermore, new publications were entered by sites for 2006 and these were incorporated into the database. **Thus, another product is an updated and more accurate bibliographic database for 1981-2006.**

Information provided within the publications was considered useful for attributions for collaboration. Keywords and abstracts provide information on the publications' topics. Acknowledgments contain information on financial and other support and on contributing LTER sites. Therefore, we obtained pdf files of as many inter-site publications as available. **This collection of publication files represents another valuable product for the LTER.**

Social network analysis was conducted on the 1981-2006 database of inter-site publications, sites and authors. We assessed the network of collaborators and relative importance of different scientists and their attributes to the network. **A presentation on the analysis was made by Johnson at the Sunbelt XXXII Conference for the International Network for Social Network Analysis in March 2012, Redondo Beach, CA.** The presentation was titled "The Evolution of Collaboration Among Researchers in the Long Term Ecological Research Network." Authorship was Jeffrey C Johnson, John Haywood, Bob Christian, Bob Waide, James Brunt, Caleb Hickman, and Shawn Dalton. The abstract is as follows:

> In an earlier paper the authors found increasing collaboration of cross site publications over-time (28 years) for researchers in the Long Term Ecological Research Network (LTER), a network of 27 ecological research sites. In an attempt to determine the factors contributing to the evolution of cohesion and cooperation across sites and over-time various standard network explanatory variables, such as homophily, were examined. In this cross site network of co-publications there appeared to be no clear underlying structural explanation accounting for the observed final cohesive structure, although there was some evidence of preferential attachment. Here we attempt to examine this evolution of cooperation more closely by expanding the analysis to actual co-authorships among researchers as opposed to just simple cross site co-authorships in scientific publications. Thus research site becomes an attribute of the authors instead of the unit of analysis itself. The work looks more closely at the contributions of such things as network closure , propinquity, preferential attachment based on betweenness, homiphily across several dimensions (e.g., shared graduate experience), and advisee/advisor relations as drivers of the evolution of cooperation in co-authorship.

Further understanding of the nature of collaboration is best addressed by direct inquiry of authors. **We have developed a general plan to do this inquiry, led by Shawn Dalton. We propose to interview select LTER scientists at the LTER ASM in September 2012. This proposal has not been officially submitted at this time (May 10, 2012).**

Reference

Johnson JC, RR Christian, JW Brunt, CR Hickman, and RB Waide. 2010. Evolution of Collaboration within the US Long-term Ecological Research Network. BioScience 60: 931-940.