Luis J. Villanueva-Rivera, Ph.D.

ljvillanueva@coquipr.com
http://research.coquipr.com

Citizenship: USA
Home: Middletown, CT

Education

2015. Doctor of Philosophy – Quantitative Ecology. Department of Forestry and Natural Resources, Purdue University. West Lafayette, Indiana.

- Dissertation title: Indices and Ecoinformatics Tools for the Study of Soundscape Dynamics

2006. Master of Science – Tropical Ecology. Department of Biology, University of Puerto Rico. Río Piedras, Puerto Rico.

- Thesis title: Calling Activity of *Eleutherodactylus* Frogs of Puerto Rico and Habitat Distribution of *E. richmondi*

1998. Bachelor of Science – Biology. Department of Biology and Ronald E. McNair Post-Baccalaureate Achievement Program, University of Puerto Rico. Río Piedras, Puerto Rico.

Employment

October 2014 – Present. Biodiversity Data Manager. Map of Life Project, Yale University. New Haven, CT. http://mol.org

- Manage a large PostgreSQL/PostGIS database with a heterogeneous structure and >500 million records.
- Prepare and import geographic data of species from a variety of formats, including shapefiles, rasters, csv files with hundreds of millions of rows, and hand-drawn maps that need to be georeferenced.
- Re-architect the database structure using several of the services in the Amazon and Google clouds.
- Help design a taxonomy database capable of handling several parallel taxonomies from all groups of life. Implement this taxonomy database in Postgres, write an API deployed in Google AppEngine, and import taxonomies to it.
- Data mining of online databases to obtain species-level information.
- Design and code an API to allow a mobile app and a website to access the species geographical data.

August 2011 – June 2014. Graduate Assistance in Areas of National Need (GAANN) Fellow. Human Environment Modeling & Analysis Facility at Purdue University. West Lafayette, IN.

- Ran a soundscape monitoring project in Indiana and Costa Rica.
- Modified automated recorders to monitor the soundscapes ot the Chiricahua National Monument in Arizona.
- Wrote and maintained a web-based application that managed sound archives.
- Wrote and published two packages for R: *soundecology* and *pumilioR*.
- Ran parallel jobs in a Windows High Performance Computing Cluster to analyze ~50,000 tasks per job in R.

August 2007 – July 2011. Research Assistant. Human Environment Modeling & Analysis Facility. Purdue University. West Lafayette, IN.

- Designed a sampling protocol for the study of soundscapes in Indiana and Costa Rica.
- Maintained, installed, and upgraded a small cluster of servers including 2 Ubuntu and 4 Windows machines.
- Maintained, repaired, and upgraded automated audio recorders (SM-1 and SM-2 by Wildlife Acoustics).
- Ran a soundscape monitoring project in Indiana.

September 2006 – August 2007. GIS Technician. Tropical Landscape Ecology Laboratory, University of

Puerto Rico. Río Piedras, PR.

- Ran analyses on satellite imagery and DEMs to model landslide risk.
- Provided technical support to students and postdocs on the use of software like ArcGIS and ERDAS Imagine and management of complex data.
- Maintained a local network of Windows computers.

February 2006 – August 2007. Co-Manager – Puerto Rico eBird. Conservation Trust of Puerto Rico and Cornell Lab of Ornithology. San Juan, PR. http://ebird.org/PR

- Compiled a list of all species and areas for their observation in Puerto Rico.
- Wrote the bilingual contents of the website for the Puerto Rican version of eBird.
- Prepared instructional material and lectures in English and Spanish about the system.
- Engaged users on the use of the eBird system and how to organize their data.
- Wrote feature stories for the website and promoted the system in the local press.
- Answered user questions and curated birds observation reports.

August 2005 – August 2006. Research Assistant – Landscape analysis program development and online GIS development. Tropical Landscape Ecology Laboratory, University of Puerto Rico. Río Piedras, PR.

- Digitized landslide data from satellite imagery.
- Wrote and ran C code to calculate indices from raster images.
- Provided technical support to students and postdocs on the use of software like ArcGIS and ERDAS Imagine and management of complex data.
- Maintained a local network of Windows computers.

August 1999 – June 2005. Teaching Assistant – General Biology, Zoology, and Human Anatomy. Department of Biology, Natural Sciences College, University of Puerto Rico. Río Piedras, PR.

- Taught 2 sections of laboratory sessions every week.
- Prepared quizzes and wrote questions for the lecture exams.
- Proctored the exams as well as graded quizzes and papers.

Computer Proficiency

- Desktop and server system administration: Ubuntu Linux, Windows
- Languages: Python, R, PHP, Bash
- Databases: MySQL, PostgreSQL, Sqlite
- GIS: ArcGIS, PostGIS, GDAL/OGR
- Parallel computing: Windows High Performance Computing cluster, R with the package *parallel*
- Cloud computing: Amazon Web Services, Google Cloud Platform
- Office suites: MS Office, LibreOffice
- Audio analysis and edition: Audition, Raven, Audacity, SoX
- Photo and image edition: Photoshop, GIMP, Imagemagick

Languages: English and Spanish

Teaching Preparation

August 2011 – June 2014. GAANN Fellowship for training on teaching philosophy and practical teaching subjects.

- Taught a short course on the theory of the study of soundscapes, as well as the use of the hardware and software available.
- Served as a TA in a course to help the students acquire and analyze data in ArcGIS.
- Took several workshops by the Center for Instructional Excellence at Purdue:
  - Student Teacher Relationships
  - How to Give a Super Lecture
  - Creating a Professional Teaching Portfolio
  - Nuts and Bolts of Setting Rules
  - Designing a Course from Scratch

August 1999 – June 2005. Teaching Assistant. University of Puerto Rico.

- Taught 2 sections of laboratory sessions every week.

Peer-Reviewed Publications

Villanueva-Rivera, L. J. 2014. *Eleutherodactylus* frogs show frequency but no temporal partitioning: implications for the acoustic niche hypothesis. PeerJ 2:e496. DOI: 10.7717/peerj.496.

Ríos-López, N. and L. J. Villanueva-Rivera. 2013. Acoustic characteristics of a native anuran (Amphibia) assemblage in a palustrine herbaceous wetland from Puerto Rico. Life: The Excitement of Biology 1: 118-135. DOI: 10.9784/LEB1(2)Rios.04.

Ospina, O. E., L. J. Villanueva-Rivera, C. J. Corrada-Bravo, and T. M. Aide. 2013. Variable response of anuran calling activity to daily precipitation and temperature: implications for climate change. Ecosphere 4:art47. DOI: 10.1890/ES12-00258.1.

Pekin, B. K., J. Jung, L. J. Villanueva-Rivera, B. C. Pijanowski and J. A. Ahumada. 2012. Modeling acoustic diversity using soundscape recordings and LIDAR-derived metrics of vertical forest structure in a neotropical rainforest. Landscape Ecology 27: 1513-1522. DOI: 10.1007/s10980-012-9806-4.

Villanueva-Rivera, L. J., and B. C. Pijanowski. 2012. Pumilio: A Web-Based Management System for Ecological Recordings. Bulletin of the Ecological Society of America 93: 71-81. DOI: 10.1890/0012-9623-93.1.71.

Villanueva-Rivera, L. J., B. C. Pijanowski, J. Doucette, and B. Pekin. 2011. A primer of acoustic analysis for landscape ecologists. Landscape Ecology 26: 1233-1246. DOI: 10.1007/s10980-011-9636-9.

Pijanowski, B.C., L. J. Villanueva-Rivera, S Dumyahn, A. Farina, B. Krause, B. Napoletano, S. Gage and N. Pieretti. 2011. Soundscape ecology: the science of sound in landscapes. BioScience 61: 203-216. DOI: 10.1525/bio.2011.61.3.6.

Acevedo, M. A., C. J. Corrada-Bravo, H. Corrada-Bravo, L. J. Villanueva-Rivera, and T. M. Aide. 2009. Automated classification of bird and amphibian calls using machine learning: A comparison of methods. Ecological Informatics 4: 206-214. DOI: 10.1016/j.ecoinf.2009.06.005

Villanueva-Rivera, L. J. 2007. Digital recorders increase detection of *Eleutherodactylus* frogs.

Herpetological Review 38: 59-63.

Acevedo, M. A. and L. J. Villanueva-Rivera. 2006. Using automated digital recording systems as effective tools for the monitoring of birds and amphibians. Wildlife Society Bulletin 34:211-214.

Villanueva-Rivera, L. J. and R. L. Joglar. 2001. *Eleutherodactylus cochranae*. Reproduction. Herpetological Review 32: 182.

Villanueva-Rivera, L. J., R. L. Joglar, and F. C. Li-Objio. 2000. *Eleutherodactylus coqui*. Predation. Herpetological Review 31: 100.

Published Data

Villanueva-Rivera L. J. 2013. Sounds of the *Eleutherodactylus* frog community from Puerto Rico. Figshare. DOI: 10.6084/m9.figshare.806302.

Villanueva-Rivera L. J. 2007. Data from: Digital recorders increase detection of *Eleutherodactylus* frogs. Dryad Digital Repository. DOI: 10.5061/dryad.c0g2t.

Acevedo M. A., L. J. Villanueva-Rivera. 2006. Data from: Using automated digital recording systems as effective tools for the monitoring of birds and amphibians. Dryad Digital Repository. DOI: 10.5061/dryad.g4n13.

Published Software

Villanueva-Rivera, L. J. and B. C. Pijanowski. 2013. *soundecology*: Soundscape ecology. R package. Current version 1.3.1. http://CRAN.R-project.org/package=soundecology

Villanueva-Rivera, L. J. and B. C. Pijanowski. 2013. *pumilioR*: Pumilio in R. R package. Current version 1.3. http://CRAN.R-project.org/package=pumilioR

Villanueva-Rivera, L. J. and B. C. Pijanowski. 2012. *Pumilio*: Web-based ecological sound archive. Current version 2.7.6. http://ljvillanueva.github.io/pumilio

Grants, Awards, and Fellowships

August 2011 – June 2014. Graduate Assistance in Areas of National Need (GAANN) Fellowship. Purdue University.

2010. OTS Research Fellowship for research at La Selva Biological Station, Costa Rica. Organization for Tropical Studies.

2010. NASA-MSU Professional Enhancement Award to attend the 2010 US-IALE Symposium. Athens, Georgia.

2004. Alexander Bergstrom Memorial Research Award. Co-writer with MA Acevedo of the proposal "Comparing novel methods of digital recordings with traditional point-count surveys for rapid assessment of bird communities."

August 2003 – July 2004. National Science Foundation - Experimental Program to Stimulate Competitive Research (NSF-EPSCoR) Graduate Fellowship. University of Puerto Rico.

December 2002 – December 2003. West Indian Manatee outreach tour and educational material. Co-writer and Coordinator of the Grant at the Caribbean Stranding Network. Toyota Foundation.

Other Courses

June 2012. SeaBASS - BioAcoustic Summer School. Applied Research Laboratory at Penn State, Office of Naval Research, National Oceanic and Atmospheric Administration (NOAA), and Acoustical Society of America (ASA). Penn State University.

May 2012. Software Tools for Sensor Networks. Long Term Ecological Research Network (LTER), Realtime Environment for Analytical Processing (REAP) Kepler project, National Center for Ecological Analysis and Synthesis (NCEAS), and DataONE. LTER Network Office, University of New Mexico, Albuquerque, NM.

August 2010. Expanding the frontier in tropical ecology through embedded sensors. Organization for Tropical Studies (OTS) and Pan-American Advanced Studies Institute (PASI). La Selva Biological Station, Costa Rica.

June – July 2010. ELME: Enhancing Linkages between Mathematics and Ecology. W. K. Kellogg Biological Station, Michigan State University.

January 2004. Avanced Training in Research about Declining Amphibian Populations. Analysis Network of Threatened Neotropical Amphibians (RANA) and the Integrated Research Challenges in Environmental Biology (IRCEB). San José and La Selva Biological Station, Costa Rica.

Outreach Projects

Biología Boricua – Audio podcast (in Spanish) with interviews with Puerto Rican researchers or biologists that work in Puerto Rico. The podcast covers what influenced them to do scientific research, some recent publications, and how they see the role of science in Puerto Rican education and culture.

CoquiPR.com – Website (in Spanish) with description, photos, and audio recordings of the Puerto Rican frogs of the genus *Eleutherodactylus*, locally known as the coquí.

AvesPR.org – Bilingual website (Spanish and English) with description, basic data, and photos by bird watchers of the bird species reported for Puerto Rico.

eBird Puerto Rico – (2006-07) Coordinator of the development of the bilingual website and application, training of staff, liaison between institutions, and educational talks to groups.