

# Migun Shakya, PhD

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## EDUCATION

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- Ph.D** Genome Sciences ◇ University of Tennessee ◇ Knoxville, TN 2008 - 2013
- B.S** Biology ◇ Southwestern Oklahoma State University ◇ Weatherford, OK 2008

## RESEARCH EXPERIENCE

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**Computational Biology Post doc** 2016 - Present

- Bioscience Division, Los Alamos National Laboratory, Los Alamos, NM
- Developing bioinformatic pipelines to ease analysis for biologists

**Postdoctoral Associate** September 2013 - September 2016

- Department of Biology, Dartmouth College, Hanover, NH
- Evolution of Gene Transfer Agents across Alphaproteobacteria

**Graduate Research Assistant** August 2009 - August 2013

- Genome Science and Technology Program
- University of Tennessee and Oak Ridge National Lab, Oak Ridge, TN
- Dissertation: Validating Approaches for Studying Microbial Diversity to Characterize Communities from Roots of *Populus deltoides*

## PUBLICATIONS

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Hynes A.P\*, **Shakya M.\***, Mercer R.G, Grull M.P, Brown L., Davidson F, Steffen E., Matchem H., Peach M.E, Berger T, Grebe K., Zhaxybayeva O., Lang A.S, (2016). Functional and evolutionary characterization of a gene transfer agent's multi-locus "genome?", *Molecular Biology and Evolution* \*These authors contributed equally

Hurt, R.A., Robeson II M.S., **Shakya M.**, Moberly, J.G., Vishnivetskaya, T.A., Gu B., and Elias, D.A. Improved Yield of High Molecular Weight DNA Coincides with Increased Microbial Diversity Access from Iron Oxide Cemented Sub-Surface Clay Environments. *Plos ONE* 2014.

**Shakya, M.**, Gottel N., Castro H., Yang Z.K., Gunter L., Labbe J., Muchero W., Bonito G., Vilgalys R., Tuskan G., Podar M., Schadt C.W. A Multifactor Analysis of Fungal and Bacterial Community Structure in the Root Microbiome of Mature *Populus deltoides* Trees. *Plos ONE* 2013. doi:10.1371/journal.pone.0076382

**Shakya, M.**, Quince, C., Campbell, J., Yang, Z., Schadt, C.W., Podar, M. Comparative metagenomic and rRNA microbial diversity characterization using Archaea and Bacteria synthetic communities *Environmental Microbiology* 2013.doi:10.1111/1462-2920.12086

Flores E.G.,**Shakya, M.**, Meneghin J.,Podar, M., Seewald., J.S., Reysenbach A-L. Inter-field Variability in the Microbial Communities of Hydrothermal Vent Deposits from a Back-Arc Basin.*Geobiology* 2012. doi:10.1111/j.1472-4669.2012.00325.x

## BOOK CHAPTERS

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Culley A.I., **Shakya M.**, Lang A.S. (2015) Viral evolution at the limits. In *Microbial Evolution under Extreme Conditions* (pp.209-222).Germany.degruyter.

## HONORS AND AWARDS

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### University of Tennessee, Knoxville

2011 Genomic Sciences Meeting Student Travel Grant

### Southwestern Oklahoma State University,

In-State Tuition Waiver 2003-2008

Ottis and Buena Ballard Memorial Scholarship 2007

Who is Who Among American Universities 2008

## SCIENTIFIC CONFERENCES

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Li P.E., Lo C-C., Anderson J., Davenport K., Bishop-Lilly K., Xu Y., Voegtly L., Feng S., Senin P., **Shakya M.**, Philipson C., Gans J., Miller N., Challacombe J., Hamilton T., Chain P.S.G. Addressing the Analysis Bottleneck Created by Next Generation Sequencing (NGS) Using EDGE Bioinformatics. In: *asm microbe*, June 1-5, 2017. Poster and Selected talk.

**Shakya M.**, Senin P., Feng S., Lo C., Hu. B, Chain P.S.G. PiReT: Pipeline for Reference Based Transcriptomics. In: *Sequencing, Finishing, analysis In the Future Meeting*, May 16-18, 2017. Poster.

**Shakya M.** and Zhaxybayeva O. Do bacteria domesticate viruses?. In: *Microbiology and Molecular Pathogenesis Program Retreat*, February 11-12, 2016. Poster and Talk.

**Shakya M.** and Zhaxybayeva O. Origin and Evolution of gene transfer agents in  $\alpha$ -proteobacteria. In: *The Burroughs Wellcome Big Data Symposium*, November 4, 2015. Poster.

**Shakya M.** and Zhaxybayeva O. Origin and Evolution of gene transfer agents in  $\alpha$ -proteobacteria. In: *1st Annual Celebration of Biomedical Research at Dartmouth (C-BRaD)*, September 21, 2015. Poster.

**Shakya M.** and Zhaxybayeva O. Origin and Evolution of gene transfer agents in  $\alpha$ -proteobacteria. In: *Mobile Genetic Elements: In Silico, In Vitro, In Vivo*, September 3-5, 2015. Selected talk.

**Shakya M.** and Zhaxybayeva O. Origin and Evolution of gene transfer agents in  $\alpha$ -proteobacteria. In: *Gordon Research Conference: Microbial Population Biology*, July 19-24, 2015. Poster.

**Shakya M.** and Zhaxybayeva O. Distinguishing Gene Transfer Agent genes from their phage homologs. In: *Boston Bacterial Meeting 2014, Boston, MA*, June 12-13, 2014. Poster.

**Shakya M.**, Drivers of microbial community structure in rhizosphere and endosphere of *Populus deltoides*. In: *American Society for Microbiology KY-TN Branch Meeting*, October 26-27, 2012. Talk.

**Shakya M.**, Gottel, N.R., Castro, H.F., Yang Z.K., Kerley M., Podar M., Doktycz, M.J., Schadt, C.W. Archaea associated with Populus and its surrounding soil and trees. In: *International Society of Microbial Ecology 14, Copenhagen, Denmark*, August 19-24, 2012. Poster.

Schadt, C.W., **Shakya M.**, Gottel, N.R., Castro, H.F., Yang Z.K., Kerley M., Bonito G., Labbe J., Muchero W., Vilgalys R., Tuskan G., Podar M., Doktycz, M.J. Roles of genotype-by-environment interactions in shaping the root-associated microbiome of Populus. In: *Ecological Society of America 97, Portland, Oregon* August 5-10, 2012.

**Shakya M.**, Gottel, N.R., Castro, H.F., Yang Z., Kerley M., Podar M., Doktycz, M.J., Schadt, C.W. Plant-Microbe Interface: Dynamics of Bacterial Microbiome of Populus del- toides In: 2012 Department of Energy Genomic Science Awardee Meeting X, February 26-29, 2012. Poster

Graham, E.D, **Shakya M.**, Xu X., Phelps, T.J., Thornton,P.E., Elias D.A.,. Characterization and Modeling Of Microbial Carbon Metabolism In Thawing Permafrost. In: American Society of Microbiology, San Francisco, CA, June 16 - 19, 2012.Poster.

Bonito, G., Schadt, C., Hameed, K., **Shakya, M.**, Chen, K. H., Tuskan, G., Vilgalys, R. (2012).Rhizospheric mycobiota associated with *Populus deltoides*. In:Mid-Atlantic States Mycological Conference, University of Tennessee, Knoxville April 13-15, 2012.

**Shakya M.**, Gottel,N.R., Castro,H.F.,Yang Z.,Kerley M., Podar M.,Doktcyz, M.J.,Schadt, C.W. Plant-Microbe Interface: Dynamics of Bacterial Microbiome of *Populus deltoides* In: *2012 Department of Energy Genomic Science Awardee Meeting X*, February 26-29, 2012.Poster.

**Shakya M.**, Campbell, J.C., Schadt, C.W.,Podar M. Experimental and Computational Approaches for Microbial Diversity Characterization Using Artificial Communities.In: *2011 Genomic Science Awardee Meeting IX* , April 10-13 , 2011.Poster and Talk.

**Shakya M.**, Campbell, J.C.,Yang,Z.K., Podar M. Experimental and Computational Approaches for Microbial Diversity Characterization Using Artificial Communities In: *International Society of Microbial Ecology 13*, August 22-27, 2010.Poster.

## TEACHING EXPERIENCE

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### **Los Alamos National Laboratory, Los Alamos, NM**

Taught a class on phylogenetic analysis for annual workshop.

Taught a class on Transcriptomics analysis for annual workshop.

### **University of Tennessee, Knoxville**

Teaching Assistant for BCMB 230 : Human Physiology Fall 2009 (2 sections)

Teaching Assistant for BIO 140 : Organization and Function of the Cell Spring 2010 (2 sections)

### **Southwestern Oklahoma State University**

Teaching Assistant for Biological Sciences Fall 2007-Spring 2008

Grader for College Algebra and Trigonometry Spring 2007-Spring 2008

## PEER REVIEW ACTIVITIES

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Reviewer for: FEMS Microbiology Ecology, Canadian Journal of Microbiology, Frontiers in Microbiology, Molecular Biology and Evolution, BMC Microbiology, MDPI - *Toxins*

## RELEVANT SKILLS

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**Programming/Scripting:** Python, Perl, R, bioconductor

**Bioinformatics:** Genome, Metagenome, Metagenetics, Methyloome, SNP analysis, phylogenetics, etc.

**Other:** makefile, unix, shell scripting, high performance computing