

**DR. VIJAY SHANKAR, PH. D.**CURRENT POSITION

Bioinformatics Staff Scientist/Core Director  
 Center for Human Genetics  
 College of Science  
 Clemson University

ADDRESS

152 Self Regional Hall  
 114 Gregor Mendel Cir,  
 Greenwood, SC 29646  
 tel. (1) 864-889-0527  
 e-mail: vshanka@clemson.edu  
 Website: <https://scienceweb.clemson.edu/chg/dr-vijay-shankar-2/>  
 GitHub: <https://github.com/vshanka23>  
 Google Scholar: <https://scholar.google.com/citations?hl=en&user=V0Cl54wAAAAJ>

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EDUCATION

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Ph.D.	<b>Wright State University</b> , Dayton, OH, USA <i>Biomedical Sciences</i>	<b>2010-2016</b>
Bachelor of Arts (BA)	<b>Miami University</b> , Oxford, OH, USA <i>Microbiology</i>	<b>2004-2008</b>

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POSITIONS

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Bioinformatics Core Director	<b>Clemson University</b> , Greenwood, SC	<b>2022-Present</b>
Bioinformatics Staff Scientist	<b>Clemson University</b> , Greenwood, SC	<b>2019-Present</b>
Bioinformatics Research Associate	<b>Clemson University</b> , Clemson, SC	<b>2016-2018</b>
Research Assistant	<b>Wright State University</b> , Dayton, OH	<b>2016</b>

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GRANTS, HONORS AND AWARDS

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Award of Excellence: Director of Bioinformatics from Clemson Center for Human Genetics	<b>2024</b>
Clemson Machine Research Instrumentation Grant: Key Personal, PI Dr. Trudy Mackay	<b>2022</b>
Center for Produce Safety Grant Award: 2019CPS07 – Co-PI with Dr. Jiang and Dr. Sasaki	<b>2019</b>
Clemson Machine Research Instrumentation Grant: Key Personal, PI Dr. Sasaki	<b>2017</b>
Best student poster presentation at Ohio Branch American Society of Microbiology	<b>2014</b>
Recipient of the Original Works Grant from Wright State Graduate Student Assembly	<b>2012</b>
Graduate Teaching Assistantship at Wright State University	<b>2009 – 2010</b>
Ohio Leaders Scholarship at Miami University	<b>2004 – 2008</b>
National Scholarship Survey Recognition	<b>2004 – 2008</b>
Dean's List at Miami University	<b>2007</b>

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**MEMBERSHIPS**


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RNA Society	2021 – present
American Society for Microbiology	2012 – present

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**CURRENT RESEARCH INTERESTS**


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Bioinformatics, GPU computing and HPC workflow management  
 Development and application of multivariate statistics in a wide array of subjects and fields  
 Development of new pipelines and improvement of current ones for analysis of NGS data  
 ‘Omics’ approaches to single-cell high-throughput sequencing data  
 Metabolic interactions in complex microbial communities  
 Role of intestinal microbiota in human health and disease

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**PUBLICATIONS**


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- I. Ates, C. Stuart, T. Rathbone, M. Barzi, G. He, A. M. Major, **V. Shankar**, R. A. Lyman, S. S. Angner, T. F. C. Mackay, S. Srinivasan, A. B. Farris, K. Bissig, and R. N. Cottle. (2024). Ex vivo gene editing and cell therapy for hereditary tyrosinemia type 1. *Hepatology Communications* 8(5): e0424
- V.A. Riley, **V. Shankar**, J. C. Holmberg, A. M. Sokolov, V. M. Neckles, K. Williams, R. A. Lyman, T. F. C. Mackay, and D. M. Feliciano. (2023). Tsc2 coordinates neuroprogenitor differentiation. *Science* 26(12).
- R. A. MacPherson, **V. Shankar**, R. R. H. Anholt and T. F. C. Mackay. (2023). Genetic and genomic analyses of *Drosophila melanogaster* models of chromatin modification disorders. *Genetics* 224(4), iyad061.
- S. S. Mokashi, **V. Shankar**, J. A. Johnstun, T. F. C. Mackay, and R. R. H. Anholt. (2023). Pleiotropic fitness effects of a *Drosophila* odorant-binding protein. *G3* 13(2), jkac307.
- T. V. Morozova, **V. Shankar\***, R. A. MacPherson, T. F. C. Mackay, and R. R. H. Anholt. (2022). Modulation of the *Drosophila* transcriptome by developmental exposure to alcohol. *BMC Genomics* 23(1), 1-14. **\*co-first author – equal contribution with T. V. Morozova.**
- H. Wang, **V. Shankar**, X. Jiang. (2022). Compositional and Functional Changes in Microbial Communities of Composts Due to the Composting-Related Factors and the Presence of *Listeria monocytogenes*. *Microbiology Spectrum* Aug 31;10(4):e0184521.
- G. Rangani, C. E. Rouse, C. Saski, R. E. Noorai, **V. Shankar**, A. L. Lawton-Rauh, I. S. Werle and N. Roma-Burgos. (2022). High Resistance to Quinclorac in Multiple-Resistant *Echinochloa colona* Associated with Elevated Stress Tolerance Gene Expression and Enriched Xenobiotic Detoxification Pathway. *Genes* 13(3), 515.
- L. Lackey, A. Coria, A. J. Ghosh, P. Grayeski, A. Hatfield, **V. Shankar**, J. Platig, Z. Xu, S. B. V. Ramos, E. K. Silverman, V. E. Ortega, M. H. Cho, C. P. Hersh, B. D. Hobbs, P. Castaldi and A. Laederach. (2021). Alternative poly-adenylation modulates  $\alpha$ 1-antitrypsin expression in chronic obstructive pulmonary disease. *PLoS Genetics* 17(11), e1009912.
- S. S. Mokashi, **V. Shankar**, J. A. Johnstun, W. Huang, T. F. C. Mackay and R. R. H. Anholt. (2021). Systems Genetics of Single Nucleotide Polymorphisms at the *Drosophila obp56h* Locus. *bioRxiv*

- M. D. Lucius, H. Ji, D. Altomare, R. Doran, B. Torkian, A. Havighorst, V. Kaza, Y. Zhang, A. V. Gasparian, J. Magagnoli, **V. Shankar**, M. Shtutman and H. Kiaris. (2021). Genomic variation in captive deer mouse (*Peromyscus maniculatus*) populations. *BMC Genomics* 22(1), 1-15.
- N. O. Nazario-Yepiz, J. F. Sobaberas, R. Lyman, M. R. Campbell III, **V. Shankar**, R. R. H. Anholt and T. F. C. Mackay. (2021). Physiological and metabolomics consequences of reduced expression of the *Drosophila bummer* triglyceride Lipase. *PLOS ONE* 16(9), e0255198.
- M. Usovsky, R. Robbins, J. F. Wilkes, D. Crippen, **V. Shankar**, T. Vuong, P. Agudelo and H. T. Nguyen. (2021) Classification methods and identification of reniform nematode resistance in known soybean cyst nematode resistant soybean genotypes. *Plant Disease* doi: 10.1094/PDIS-01-21-0051-RE.
- J. A. Deaver, M, N, Soni, K. I. Diviesti, K. T. Finneran, **V. Shankar**, S. C. Popat. (2021) Taxonomic and Functional Variants Induced by an Overloading Event in Anaerobic Codigestion of Municipal Wastewater Sludge with Fats, Oils, and Grease. *ACS ES&T Engineering* 1: 1205-1216.
- S. S. Mokashi, **V. Shankar\***, R. A. MacPherson, R. C. Hannah, T. F. C. Mackay and R. R. H. Anholt. (2021) Developmental Alcohol Exposure in *Drosophila*: Effects on Adult Phenotypes and Gene Expression in the Brain. *Frontiers in Psychiatry* 12:699033. doi: 10.3389/fpsy.2021.699033. *PMC8341641*. **\*co-first author – equal contribution with S. S. Mokashi.**
- B. M. Baker, S. S. Mokashi, **V. Shankar\***, J. S. Hatfield, R. C. Hannah, T. F. C. Mackay and R. R. H. Anholt. (2021) The *Drosophila* brain on cocaine at single cell resolution. *Genome Research* doi: 10.1101/gr.268037.120. **\*co-first author – equal contribution with B. M. Baker and S. S. Mokashi.**
- J. A. Johnstun, **V. Shankar**, S. Mokashi, L. T. Sunkara, U. E. Ihearahu, R. L. Lyman, T. F. C. Mackay and R. H. A. Anholt. (2021) Functional Diversification, Redundancy, and Epistasis among Paralogs of the *Drosophila melanogaster* *Obp50a-d* Gene Cluster. *Molecular Biology and Evolution* 38(5): 2030-2044.
- I. Q. Phan, C. A. Rice, J. Craig, R. E. Noorai, J. McDonald, S. Subramanian, L. Tillery, L. K. Barrett, **V. Shankar**, J. C. Morris and W. C. Van Voorhis. (2021) The Transcriptome of *Balamuthia mandrillaris* trophozoites for structure-based drug design. *Scientific Reports* 11(1): 1-13.
- R. E. Noorai, **V. Shankar\***, N. H. Freese, C. M. Gregorski and S. C. Chapman. (2019) Discovery of genomic variants by whole-genome resequencing of the North American Araucana chicken. *PLOS ONE* 14(12): e0225834. *PMC6903725* **\*co-first author – equal contribution with R. E. Noorai.**
- D. Nayduch, **V. Shankar**, M. K. Mills, T. Robl, B. Drolet, M. Ruder, E. Scully and C. Saski. (2019) Transcriptome response of female *Culicoides sonorensis* biting midges (Diptera: Ceratopogonidae) to early infection with Epizootic Hemorrhagic Disease Virus (EHDV-2). *Viruses* 11(5): 473. *PMC6563219*
- S. K. Krombeen, **V. Shankar**, R. E. Noorai, C. Saski, J. Sharp, M. Wilson and T. Wilmoth. (2019) The identification of differentially expressed genes between extremes of placental efficiency in maternal line gilts on day 95 of gestation. *BMC Genomics* 20(1): 254.
- T. Zhebentyayeva, **V. Shankar**, R. Scorza, A. Callahan, M. Ravelonandro, S. Castro, T. Dejong, C. Saski and C. Dardick. (2019) Genetic characterization of world-wide *Prunus domestica* (plum) germplasm using sequence-based genotyping. *Horticulture Research* 6(1): 12. *PMC6312543*
- Y. Qiu, J. E. Milanes, J. A. Jones, R. E. Noorai, **V. Shankar**, and J. Morris. (2018) Glucose signalling is important for nutrient adaptation during differentiation of pleomorphic African trypanosomes. *mSphere* 3(5), e00366-18. *PMC6211221*.

- A. Ramos-Garcia, **V. Shankar**, C. Sasaki, T. Hsiang and D. Freedman. (2018) Draft Genome Sequence of the 1,4-Dioxane-Degrading Bacterium *Pseudonocardia dioxanivorans* BERK-1. *Genome Announc* 6(14), e00207-18. *PMC5887028*
- **V. Shankar**, R. Agans, and O. Paliy. (2017) Advantages of phylogenetic distance based constrained ordination analyses for the examination of microbial communities. *Sci Rep* 7(1): 6481. *PMC5526943*
- **V. Shankar**, M. Gouda, J. Moncivaiz, A. Gordon, N. V. Reo, L. Hussein, and O. Paliy. (2017) Differences in gut metabolites and microbial composition and functions between Egyptian and US teenagers are consistent with consumed diets. *mSystems* 2(1): e00169-16. *PMC5296411*
- O. Paliy and **V. Shankar**. (2016) Application of multivariate statistical techniques in microbial ecology. *Mol. Ecol.* 25(5), 1032-57. *PMC4769650*
- **V. Shankar**, N. Reo, and O. Paliy. (2015) Simultaneous fecal microbial and metabolite profiling enables accurate classification of pediatric irritable bowel syndrome. *Microbiome* 3:73. *PMC4675077*.
- **V. Shankar**, D. Homer, L. Rigsbee, H. J. Khamis, S. Michail, M. Raymer, N. V. Reo, and O. Paliy. (2015) The networks of human gut microbe-metabolite associations are different between health and irritable bowel syndrome. *ISME J* 9(8), 1899-903. *PMID25635640*.
- **V. Shankar**, M. J. Hamilton, A. Khoruts, A. Kilburn, T. Unno, O. Paliy, and M. J. Sadowsky. (2014) Species and genus level resolution analysis of gut microbiota in *Clostridium difficile* patients following fecal microbiota transplantation. *Microbiome* 2:13. *PMC4030581*.
- **V. Shankar**, R. Agans, B. Holmes, M. Raymer, and O. Paliy. (2013) Do gut microbial communities differ in pediatric IBS and health? *Gut Microbes* 4(4): 347-352. *PMID23674073*.
- L. Rigsbee, R. Agans, **V. Shankar**, H. Kenche, H. Khamis, S. Michail, and O. Paliy. (2012) Quantitative profiling of gut microbiota of children with diarrhea-predominant Irritable Bowel Syndrome. *Am. J. Gastroenterol.* 107(11), 1740-51. *PMID22986438*.

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## BOOK CHAPTERS

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- O. Paliy, **V. Shankar**, and M. Sagova-Mareckova. (2014). Chapter 9: Phylogenetic Microarrays. *Bioinformatics and Data Analysis in Microbiology*. Ed. Ozlem Tastan Bishop. *Horizon/Caister press*. 207-229. Print.
- O. Paliy, **V. Shankar**. (2014). Chapter 11: Applications of Phylogenetic Microarrays in Profiling of Human Microbiomes. *Microarrays: Current Technology, Innovation and Applications*. Ed Melanie Woodward. *Horizon press*. 195-215. Print.

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## PRESENTATIONS AND INVITED TALKS

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- **V. Shankar.** (invited talk) Leveraging the power of hybrid sequencing and inheritance patterns to identify causal variants in pediatric genetics diseases. *South Carolina Genetics Conclave 2021*. <https://www.youtube.com/watch?v=cNHQxznxMYM>
- **V. Shankar.** (invited talk) The *Drosophila* brain on drugs at the single cell resolution. *10X Genomics Webinar titled: "Gain a Multidimensional View of Biology with Single Cell Solutions"* jointly hosted by Clemson University and 10X Genomics. [https://pages.10xgenomics.com/wbr-2021-05-25-event-ra\\_g-clemson-single-cell-amr\\_lp.html](https://pages.10xgenomics.com/wbr-2021-05-25-event-ra_g-clemson-single-cell-amr_lp.html)
- B. M. Baker, S. S. Mokashi, **V. Shankar**, J. S. Hatfield, R. C. Hannah, T. F. C. Mackay and R. R. H. Anholt. A high resolution, single-cell perspective on transcriptional response to cocaine in *Drosophila melanogaster* brains. *NIH NIDA Genetics Consortium Meeting 2020*.
- **V. Shankar**, D. Homer, L. Rigsbee, H. Khamis, S. Michail, M. Raymer, N. Reo and O. Paliy. Fecal metabolites in pediatric IBS. *American Society of Microbiology, National Conference, Washington DC, 2014*.
- **V. Shankar**, D. Homer, L. Rigsbee, H. Khamis, S. Michail, M. Raymer, N. Reo and O. Paliy. Fecal metabolites in pediatric IBS. *Ohio Branch American Society of Microbiology, Ohio State University, OH, 2014*. **Won the award for the best graduate student poster presentation.**
- **V. Shankar**, L. Rigsbee, H. Kenche, S. Michail, and O. Paliy. Effects of VSL#3 on the composition of intestinal microbiota in IBS-D patients. *FASEB Probiotics, Intestinal Microbiota and the Host, Carefree, AZ, 2011*.

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## SKILLS

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- Highly skilled in the use multivariate statistical and mathematical approaches to draw biological inferences from complex datasets (main focus of my doctoral dissertation). Also skilled in application of integrative approaches across multiple datasets to extract biological insights at the systems level (Systems Biology).
- Expertise in the use of Next-Generation Sequencing technologies such as Illumina MiSeq, Ion Torrent PGM and Proton, and 454 Pyrosequencing to profile complex microbial communities.
- Proficient at analyzing data acquired from Next-Generation Sequencing technologies and microarrays, and in building analysis pipelines for such datasets.
- Highly skilled at analyzing and interpreting single cell transcriptomics data.
- Proficiency in Matlab, Python and R scripting languages, and in UNIX environment.
- Experienced in laboratory molecular biological techniques such as PCR, RT-PCR, qPCR, Nucleic Acid extraction and in molecular techniques required for NGS library prep and sequencing (Illumina and Life Technologies based).
- Proficient as Systems Admin for HPC maintenance and in most operating systems and office related softwares. Also proficient in designing and building analysis workstations (hardware expertise) and cluster infrastructure.