

Alexander Knyshev, Ph.D.

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RESEARCH INTERESTS

I am currently a researcher on the National Alzheimer Disease Sequencing Project (ADSP) and ADSP-Functional Genomics Consortium project to unravel cell-specific mechanisms of AD progression and contributing to large-scale efforts to decipher the genetic component of Alzheimer disease. I am specifically focused on developing and executing novel computational pipelines for analysis of in-house and publicly available high-throughput next generation sequencing data. My prior research experience in evolutionary genomics and bioinformatics and work on multiple study organisms align well with the expertise required to design and troubleshoot sophisticated software for analysis of NGS data.

EDUCATION

- Sep 2006 - Aug 2010: **BSc, Biology.** St. Petersburg State University (St. Petersburg, Russia).
- Sep 2010 - Aug 2012: **MSc, Biology.** St. Petersburg State University (St. Petersburg, Russia).
- Sep 2013 - Dec 2018: **Ph.D., Entomology.** University of California, Riverside (Riverside, CA).

EMPLOYMENT HISTORY

- 2011: Research Assistant. Biological Scientific Research Institute, St. Petersburg State University, Russia.
- 2013-2018: Research Assistant. University of California, Riverside (Department of Entomology), Riverside, CA, USA .
- Winter 2015: Teaching Assistant. Insect Biodiversity ENTM107. University of California Riverside, USA.
- Spring 2016: Teaching Assistant. Insect Evolution ENTM106. University of California Riverside, USA.
- Winter 2017: Teaching Assistant. Insect Biodiversity ENTM107. University of California Riverside, USA.
- Spring 2018: Teaching Assistant. Insect Evolution ENTM106. University of California Riverside, USA.
- 2019-2021: Postdoctoral scholar. University of California, Riverside (Department of Entomology), Riverside, CA, USA.
- 2021-2022: Postdoctoral research fellow. University of Rhode Island (Department of Biological Sciences), Kingston, RI, USA.
- 2022-current: Postdoctoral Associate. Boston University (Department of Medicine), Boston, MA.

TEACHING EXPERIENCE

- 2011: Teaching Assistant. Insect Field Biology course. St. Petersburg State University, Russia.
- 2015: Teaching Assistant. Insect Biodiversity ENTM107. University of California Riverside, USA.
- 2016: Teaching Assistant. Insect Evolution ENTM106. University of California Riverside, USA.
- 2017: Teaching Assistant. Insect Biodiversity ENTM107. University of California Riverside, USA.
- 2018: Teaching Assistant. Insect Evolution ENTM106. University of California Riverside, USA.
- 2018-2019: Bioinformatics and phylogenetics workshops for graduate students. University of California, Riverside, USA. Some of the materials are available at <https://alexknyshov.github.io/>

FELLOWSHIPS, AWARDS AND GRANTS

- 2011: Russian Foundation for Basic Research. Project No 09-04-00968 (Project leader: Fedor V. Konstantinov).
- 2010-2011: Leading scientific schools. Project No 3332.2010.4 (Project leader: Prof. A.A. Stekolnikov).
- 2011: Student award from the charitable foundation “Inessa’s Fund”.
- 2013: Dean’s Distinguished Fellowship Award (UCR)
- 2014: SysEB Travel Grant Award (for museum work in BMNH)
First place award for Student Seminar Day Poster at University of California Riverside
- 2016: Graduate Dean’s Dissertation Research Grant (UCR)
- 2017: Dr. Mir S. Mulla and Leila Mulla Endowed Scholarship (CNAS UCR)

PROFESSIONAL SERVICE

Reviewed for the following journals (2014 - 2020): Acta Entomologica Musei Nationalis Pragae, Biological Journal of the Linnean Society, Insects, Insect Systematics & Evolution, Parasites & Vectors, PeerJ, Zoologischer Anzeiger, and Zootaxa.
An invited editor for a special issue in Zootaxa (2020).

LEADERSHIP

Student mentorship: Trained and mentored a total of 3 graduate and 6 undergraduate students at UCR. Training included skills in microscopy (4 students), molecular lab methods (4 students), bioinformatics (5 students), and machine learning (1 student).

Meeting organizer: Organized and moderated a symposium on phylogenomic analysis at XXXVIII Annual Meeting of the Willi Hennig Society (2019).

ORAL PRESENTATIONS

Knyshov, A., Hoey-Chamberlain, R., Leon, S., & Weirauch, C. (2014) Biodiversity, “wing organs”, and sexual dimorphism: systematics of *Chinannus* Wygodzinsky (Hemiptera: Schizopteridae) and the Ogeriinae. Fifth Quadrennial Meeting of the International Heteropterists' Society.

Knyshov, A., Hoey-Chamberlain, R., Leon, S., & Weirauch, C. (2014). A taxonomic revision of the genus *Chinannus* Wygodzinsky (Hemiptera: Schizopteridae) with a phylogenetic analysis of the Ogeriinae. Entomological Society of America Annual Meeting, Portland, Oregon.

Knyshov, A. & Weirauch, C. (2015) Structural diversity and phylogenetic relationships within Dipsocoromorpha (Hemiptera: Heteroptera). The Hemipteroid Insect Phylogenetics (HIP) Workshop, Urbana-Champaign, Illinois.

Knyshov, A. & Weirauch, C. (2015) Phylogeny and morphology of Dipsocoromorpha (Hemiptera: Heteroptera). 7th Dresden Meeting on Insect Phylogeny, Dresden, Germany.

Knyshov, A., Hoey-Chamberlain, R., & Weirauch, C. (2016) Blunt labium, acute problem: taxonomic mess in the *Corixidea* genus group (Heteroptera: Schizopteridae). 2016 International Congress of Entomology, Orlando, Florida.

Knyshov, A., Gordon, E., & Weirauch, C. (2017) Sequence capture of archival insect specimens using custom PCR-generated baits. Entomological Society of America Annual Meeting, Denver, Colorado.

Knyshov, A., & Weirauch, C. (2019) Exploring data manipulation strategies in phylogenomic analysis of assassin bugs (Insecta: Hemiptera: Heteroptera: Reduvioidea). XXXVIII Annual Meeting of the Willi Hennig Society, University of California, Berkeley

Knyshov, A., Hoey-Chamberlain, R., Lemmon, A., Lemmon, E.M., & Weirauch, C. (2019) Phylogenomic analysis of Reduvioidea (Insecta: Hemiptera) with emphasis on data processing strategies. Evolution 2019, Providence, Rhode Island.

Knyshov, A., Hrytsenko, Y., & Schwartz, R.S. (2021) Sources of conflict in the phylogenetic placement of treeshrews investigated using whole genome data. Evolution 2021, Online.

POSTER PRESENTATIONS

Knyshov, A., R. Hoey-Chamberlain, C. Weirauch (2013). Comparative morphology of the male abdomen in minute litter bugs (Heteroptera: Dipsocoromorpha: Schizopteridae). Entomological Society of America Annual Meeting, Austin, Texas.

Knyshov, A., S. Du, R. Hoey-Chamberlain, S. Frankenberg, J. Rodriguez, C. Weirauch (2017). Evolutionary history of minute litter bugs (Hemiptera: Dipsocoromorpha) based on morphological and molecular data. Entomological Society of America Annual Meeting, Denver, Colorado.

Knyshov, A., Hu, J., Lin, M., Zhou, B., Empawi, J.A., Puri, S., Stein, T.D., Farrer, L.A., Wolozin,

B., & Zhang, X. (2023) Characterization of long non-coding RNA and circular RNA in the aging human hippocampus. American Society of Human Genetics 2023, Washington, DC.

PUBLICATIONS (starting with the most recent)

Knyshev, A., Gordon, E.R.L., Masonick, P. K., Castillo, S., Forero, D., Hoey-Chamberlain, R., Hwang, W., Johnson, K.P., Lemmon, A.R., Moriarty Lemmon, E., Standring, S., Zhang, J., Weirauch, C. (2023) Chromosome-aware phylogenomics of Assassin Bugs (Hemiptera: Reduviidae) elucidates ancient gene conflict. *Molecular Biology and Evolution* 40 (8): msad168.

Knyshev, A., Hrytsenko, Y., Literman, R., & Schwartz, R.S. (2021) Interrogating Genomic Data in the Phylogenetic Placement of Treeshrews Reveals Potential Sources of Conflict. Preprint on [bioRxiv](https://doi.org/10.1101/2021.08.10.455811).

Frankenberg, S., **Knyshev, A.**, Hoey-Chamberlain, R., & Weirauch, C. (2021) Taxonomic revision of *Guapinannus* Wygodzinsky, 1951 (Hemiptera: Schizopteridae), with description of 19 new species. *Zootaxa* 4958(1).

Knyshev, A., Gordon, E.R.L., & Weirauch, C. (2021) New alignment-based sequence extraction software (ALiBaSeq) and its utility for deep level phylogenetics. *PeerJ* 9:e11019.

Knyshev, A., Hoang, S., & Weirauch, C. (2021) Pretrained Convolutional Neural Networks Perform Well in a Challenging Test Case: Identification of Plant Bugs (Hemiptera: Miridae) Using a Small Number of Training Images. *Insect Systematics and Diversity* 5 (2): 3.

Knyshev, A., Weirauch, C., & Hoey-Chamberlain, R. (2020) Phylogenetic relationships of Dipsocoromorpha (Insecta: Hemiptera: Heteroptera) inferred by molecular and morphological data. *Cladistics* 2020, 1-28.

Weirauch, C., **Knyshev, A.**, & Hoey-Chamberlain, R. (2020) Four new genera of Schizopteridae (Hemiptera: Heteroptera) from the Afrotropical and Neotropical regions. *Zootaxa* 4768 (1): 95-111.

de Almeida, F.R.A., Carvalho-Filho, F.D.S., **Knyshev, A.**, Fernandes, J.A.M. (2020) *Voragocoris weirauchae* sp. n.(Heteroptera: Schizopteridae: Schizopterinae), a further minute litter bug species from Brazil. *Zootaxa* 4729(1): 138-144.

Knyshev, A., Hoey-Chamberlain, R., & Weirauch, C. (2019) Hybrid enrichment of poorly preserved museum specimens refines homology hypotheses in a group of minute litter bugs (Hemiptera: Dipsocoromorpha: Schizopteridae). *Systematic Entomology* 44 (4): 985-995.

Knyshev, A., Gordon, E. R. L., & Weirauch, C. (2019) Cost-efficient high throughput capture of museum arthropod specimen DNA using PCR-generated baits. *Methods in Ecology and Evolution* 10 (6): 841-852.

Silveira, D.D., Barcellos, A., **Knyshev, A.** (2019) *Hoplonannus australis* sp. nov. (Hemiptera, Schizopteridae): amended diagnosis of the genus and first record from South America. *Zootaxa* 4568(2): 394-400.

- Knyshov, A.**, Hoey-Chamberlain, R., & Weirauch, C. (2018) Comparative morphology of male genitalic structures in the minute litter bugs Dipsocoromorpha (Insecta: Hemiptera: Heteroptera). *Journal of morphology* 279(10): 1–38.
- Frankenberg, S., Hoong, C., **Knyshov, A.**, & Weirauch, C. (2018) Heads up: evolution of exaggerated head length in the minute litter bug genus *Nannocoris* Reuter (Hemiptera: Schizopteridae). *Organisms Diversity & Evolution* 18(2): 211-224.
- Weirauch, C., Hoey-Chamberlain, R., & **Knyshov, A.** (2018) Synopsis of Schizopteridae (Hemiptera, Heteroptera, Dipsocoromorpha) from the United States, with description of seven new species from the US and Mexico. *ZooKeys* 796: 49–82.
- Weirauch, C., Whorral, K., **Knyshov, A.**, & Hoey-Chamberlain, R. (2018) Giant among dwarfs: *Meganannus lewisi*, gen. n. and sp. n., a new genus and species of minute litter bugs from Costa Rica (Hemiptera: Schizopteridae). *Zootaxa* 4370(2): 156-170.
- Weirauch, C., **Knyshov, A.**, & Hoey-Chamberlain, R. (2017) *Machadonannus brailovskyi* n. sp., a new species of Schizopteridae (Hemiptera: Heteroptera) from the Afrotropical Region. *Dugesiana* 24(2): 279-286.
- Knyshov A.**, S. Leon, R. Hoey-Chamberlain, C. Weirauch (2016). Pegs, Pouches and Spines: systematics and comparative morphology of the New World litter bug genus *Chinannus* Wygodzinsky, 1948. *Thomas Say Monographs*, Entomological Society of America, Annapolis, MD, 112 pp.
- Choe, D. H., Park, H., Vo, C., & **Knyshov, A.** (2016). Chemically Mediated Arrestment of the Bed Bug, *Cimex lectularius*, by Volatiles Associated with Exuviae of Conspecifics. *PloS one*, 11(7), e0159520.
- F.V. Konstantinov and **A.A. Knyshov** (2015). The tribe Bryocorini (Insecta: Heteroptera: Miridae: Bryocorinae): phylogeny, description of a new genus and adaptive radiation on ferns. *Zoological Journal of the Linnean Society* 175(3): 441-472.
- Knyshov A.A.** and F.V. Konstantinov (2013). A taxonomic revision of the genus *Hyoidea* Reuter, 1876 (Heteroptera: Miridae: Orthotylinae). *Acta Entomologica Musei Nationalis Pragae* 53(1): 1-32.
- Knyshov A.A.** and F.V. Konstantinov (2013). A taxonomic revision of the genus *Platycranus* Fieber, 1870 (Heteroptera: Miridae: Orthotylinae). *Zootaxa* 3637(3): 201-253.
- Knyshov A.A.** and F.V. Konstantinov (2012). A new genus and species of the tribe Orthotylini (Heteroptera: Miridae: Orthotylinae) from Central Asia. *European Journal of Entomology*, 109(1): 117-128.