

## Samuel V. Arsenault

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### Education

- Doctor of Philosophy, Entomology, University of Georgia 2020
  - Advisor: Dr. Brendan Hunt
  - Committee members: Drs. Kenneth Ross, Allen Moore, and Robert Schmitz
  - Graduate Certificate in Bioinformatics
- Bachelor of Science, Biology, University of Georgia 2015
  - Advisor: Dr. Jonathan Arnold
  - Concentration in Neuroscience
- Bachelor of Science, Mathematics, University of Georgia 2015

### Publications

9. **Arsenault, S.**, King, J. T., Kay, S., Lacy, K. D., Ross, K. G. & Hunt, B. G. Simple inheritance, complex regulation: supergene-mediated fire ant social polymorphism. *Molecular Ecology*. 2020;00:1–15. <https://doi.org/10.1111/mec.15581>
8. Zheng, Y., Martin, S. H., Gotzek, D., **Arsenault, S.**, Duchen, P., Helleu, Q., Riba-Grognuz, O., Hunt, B. G., Salamin, N., Shoemaker, D., Ross, K. G. & Keller, L. Evolution of a Supergene That Regulates a Trans-Species Social Polymorphism. *Nature Ecology and Evolution*. 4(2), 240–249. doi:10.1038/s41559-019-1081-1.
7. Deng, Z., Cheong, J. H., Caranica, C., Wu, L., Qiu, X., Judge, M. T., Hull, B., Rodriguez, C., Griffith, J., Al-Omari, A., **Arsenault, S.**, Schüttler, H. B., Mao, L. & Arnold, J. Single Cells of *Neurospora crassa* Show Circadian Oscillations, Light Entrainment, Temperature Compensation, and Phase Synchronization. *IEEE Access* 7, 49403–49417 (2019).
6. **Arsenault, S.**, Glastad, K. M. & Hunt, B. G. Leveraging technological innovations to investigate evolutionary transitions to eusociality. *Curr. Opin. Insect Sci.* 569, 1–7 (2019).
5. **Arsenault, S.**, Hunt, B. G. & Rehan, S. M. The effect of maternal care on gene expression and DNA methylation in a subsocial bee. *Nat. Commun.* 9, 3468 (2018).
4. Glastad, K. M., **Arsenault, S.**, Vertacnik, K. L., Geib, S. M., Kay, S., Danforth, B. N., Rehan, S. M., Linnen, C. R., Kocher, S. D. & Hunt, B. G. Variation in DNA Methylation Is Not Consistently Reflected by Sociality in Hymenoptera. *Genome Biol. Evol.* 9, 1687–1698 (2017).
3. Deng, Z., **Arsenault, S.**, Mao, L., Arnold, J. Measuring synchronization of stochastic oscillators in biology. *J. Phys. Conf. Ser.* 750:12001 (2016).
2. Deng, Z., **Arsenault, S.**, Caranica, C., Griffith, J., Zhu, T., Al-Omari, A., Schüttler, H.-B., Arnold, J. & Mao, L. Synchronizing stochastic circadian oscillators in single cells of *Neurospora crassa*. *Sci. Rep.* 6, 35828 (2016).

1. Deng, Z., **Arsenault, S.**, Zhu, T., Cheng, R., Griffith, J., Arnold, J. & Mao, L. Single cell measurements on the biological clock by microfluidics. *Proc. 18th Int. Conf. Miniaturized Syst. Chem. Life Sci.* 881–883 (2014).

## Research Experience

- Tribble Lab, Harvard University (Fall 2020 - Present)
  - Evolution of queen polymorphisms in the genus *Leptothorax* using genomic and morphometrics approaches
- Brendan G. Hunt: Evolutionary Insect Genetics Lab, UGA (Fall 2015 - Fall 2020)
  - Evolution and regulation of the social form-mediating supergene in *S. invicta* using RNA-seq and ATAC-seq approaches
  - Caste differentiation in *S. invicta* and the impact of the social form-mediating supergene therein
  - Effect of maternal care on DNA methylation patterns and gene expression in *C. calcarata*
  - Molecular evolution of DNA methylation enzymes in Hymenoptera
- Schmitz Laboratory, UGA (Fall 2015 - Summer 2018)
  - DNA methylation patterns in *P. canadensis*, *D. quadriceps*, and *N. vespilloides*
  - Transcription factor binding domains in *Z. mays*
- Tarleton Laboratory, UGA (Fall 2015)
  - Developed web-based tools for CRISPR-Cas9 guide RNA synthesis
  - Applications of the CRISPR-Cas9 in *T. cruzi*
- Laboratory for Fungal Genomics and Computational Biology (FGCB), UGA (Spring 2014 - Fall 2015)
  - Computational modeling of synchronous behavior arising in networks of cells
  - Gene regulatory networks underlying circadian rhythms in *N. crassa*
- Nanotechnology and Biomedicine Research Experience for Undergraduates (REU), College of Engineering, UGA (Summer 2014 and Summer 2015)
  - Microfluidics applications for the study circadian rhythms in individual cells
  - Single-cell measurement fluorescence measurement of gene expression

## Conferences and Presentations

- Invited Departmental Seminar at University of Rochester (October 2022)
- Chalk Talk at Boston Evolutionary Genomics Supergroup Annual Retreat (October 2022)
- Oral Presentation at 2022 SINNERS Conference (June 2022)
- Oral Presentation at 2021 ESA Annual Meeting (November 2021)
- Poster Presentation at the Evolution of Complex Life Conference (May 2019)
- Oral Presentation at the 2018 ESA, ESC, and ESBC Joint Annual Meeting (November 2018)
- Oral Presentation at the Biology and Genomics of Social Insects Conference at Cold Spring Harbor Laboratories (May 2018)
- Oral Presentation for the Enthusiasts of Diversity, Genetics, and Evolution at UGA (March 2018)
- Oral Presentation at the 2017 Entomological Society of America Meeting (November 2017)
- Poster Presentation at the 43<sup>rd</sup> annual Southeastern Population Ecology and Evolutionary Genetics meeting (October 2016)

- Received award for Best Graduate Student Poster Presentation
- Poster Presentation at the Southeast BME Regional Conference (October 2015)
- Presentation at the College of Engineering REU Research Symposium (July 2015)
  - Event organizer
- Poster Showcase of REU@UGA (July 2015)
- Presentation for REU Participants (July 2014)

#### Grants, Awards, and Scholarships

- H.O. Lund Entomology Scholarship (Fall 2019)
- Outstanding Teaching Assistant Award (Spring 2018)
- UGA Graduate School Student Travel Grant (Fall 2017)
- H.O. Lund Outstanding Achievement Award for Scholarship and Research – PhD (Fall 2017)
- Honorable Mention for the National Science Foundation Graduate Research Fellowship Program (Fall 2016)
- Innovative and Interdisciplinary Research Grant (Summer 2016)

#### Teaching Experience

- Informal Assistant, “Integrated Science” - LS50 (Harvard University, Fall 2022)
- Teaching Assistant for “Insects and the Environment” - ENTO 2010 (University of Georgia, Spring 2018)
  - Maintained the online material as well as organized the gradebook.
- Graduate Laboratory Assistant, “Principles of Biology II Lab” - BIOL 1108L (2017)
  - Organized and taught the lab portion of introductory biology for science majors focusing on research techniques and general concepts in biology.
- Teaching Assistant for “Principles of Biology II” - BIOL 1108 taught by Kathrin Stanger-Hall (Spring 2016)
  - Helped to develop in-class assignments, lead discussion groups, and grade exams
- Tutor for Mathnasium at Woodlawn Square – Marietta, GA, USA (2010-2011)
  - Mathematics tutor for students from age 5-18 in all levels of mathematics up to and including AP Calculus

#### References

- Waring (Buck) Tribble, John Harvard Research Fellow, Faculty of Arts and Sciences, Harvard University
  - Email: bucktribble@g.harvard.edu
- Brendan G. Hunt, Associate Professor, Department of Entomology, University of Georgia
  - Email: huntbg@uga.edu
- Kenneth G. Ross, Professor, Department of Entomology, University of Georgia
  - Email: kenross@uga.edu
- Jonathan Arnold, Professor, Department of Genetics, University of Georgia
  - Email: arnold@uga.edu