Philip J. Freda Jr.

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Education

Saint Joseph's University, Philadelphia, Pennsylvania, 2008 – Present

- Graduate Studies (M.S.) in biology, 2012- Present, areas of specialization: Evolutionary biology, bioinformatics, population genetics, and ecology. Cumulative GPA: 4.00
- Post baccalaureate studies in biology, 2009 – 2012. Cumulative GPA: 3.73

Pennsylvania State University, Abington, Pennsylvania, 2001 – 2005

- B.S. in Administration of Justice
- Minor in Sociology

Research Interests

- Theoretical, computational, and field study on the effects of global climate change on DNA sequence variation and evolutionary mechanisms.
- Changes in biodiversity and biological interactions due to global climate change and habitat destruction.
- How increases in temperature and atmospheric greenhouse gases affect the behavior of ecological systems.
- Track species migration, adaptation, and extinction in areas affected by environmental change.
- Population genetics and adaptation of migrating and invasive species.
- Investigation of changes in levels of phenotypic plasticity and DNA sequence variation across environmental gradients.

Research Experience

Graduate thesis research: Department of Biology, Saint Joseph's University, 2012 – Present (research advisor: Fr. John Braverman, S.J., Ph.D.)

- Estimation of temporal variation at microsatellite loci in wild-caught specimens of *Drosophila simulans* to determine local population dynamics.
- Identification and analysis of DNA sequence variation over time in *cytochrome oxidase subunit I* (*COI*) in wild-caught specimens of the invasive pest species *Drosophila suzukii* to understand its range expansion and local adaptation.

Post baccalaureate research: Department of Biology, Saint Joseph's University, 2010 – 2012 (research advisor: Fr. John Braverman, S.J., Ph.D.)

- Identified and analyzed genetic variation over time in candidate genes of *Drosophila simulans* to determine forces involved in evolution.
- Developed and implemented collection and classification protocols for wild-caught *Drosophila* species.
- Collected data on *Drosophila* species in the local area to formulate a profile of biodiversity and local adaptation.

Post baccalaureate research: Department of Biology, Saint Joseph's University, 2010 – Present (research advisor: Dr. Clint Springer, Ph.D.)

- ❖ Developed computational and analytical studies of flowering time genetics in recombinant inbred lines of *Arabidopsis thaliana* using bioinformatics tools.
- ❖ Identified and examined quantitative trait loci involved with variation observed in flowering time, in both ambient and elevated carbon dioxide levels, to assess future impacts of global climate change.
- ❖ Determined that quantitative effect and loci expressivity varies in different environmental conditions.

Research Techniques

Molecular: PCR ❖ Gel electrophoresis ❖ Primer design ❖ DNA extraction ❖ DNA quantification ❖ DNA purification ❖ Pulsed-field gel electrophoresis ❖ Restriction digest ❖ RNAi

Bioinformatics: Sequence alignment ❖ Sequence assembly ❖ Gene annotation ❖ NCBI: BLAST ❖ Sequence variation statistical analysis ❖ QTL mapping and analysis

Ecological and Organismic: Organism collection and trapping (*Drosophila*) ❖ *Drosophila* rearing and maintenance

Teaching Experience

GK-12 Teaching Fellow: Wagner Free Institute of Science, Philadelphia, PA, 2012-Present

- ❖ Instruction of hands-on science lessons in Philadelphia school district elementary classrooms and on educational field trips.
- ❖ Preparation of classroom materials, experiments, and lesson plans.
- ❖ Collaboration with classroom teachers, full-time museum staff, and other graduate fellows to facilitate activities, field trips, and learning.

Laboratory Research Assistant: Department of Biology, Saint Joseph's University, 2012-Present

- ❖ Instruction of laboratory protocols and experimentation procedures to undergraduate researchers.
- ❖ Preparation and instruction of laboratory discussions and workshops.
- ❖ Drafting of laboratory protocols and notebooks.

Intern: Noyce Scholarship Program, Philadelphia School District's Summer Bridge Program, summer 2010.

- ❖ Taught lectures on evolution, general biology, physics, ecology, and astronomy.
- ❖ Collaborated with teachers and fellow interns on pedagogical approaches and lesson plans.
- ❖ Instilled appreciation of the sciences and of nature in students entering high school.

Teacher's Assistant: *Biology I – Cells Lab*: Department of Biology, Saint Joseph's University, 2010

- ❖ Assisted in laboratory maintenance, grading, and conceptual ideas.
- ❖ Aided students in understanding concepts and goals of the curriculum.

Publications and Presentations

Freda, P. and Braverman, J. 2013. *Drosophila suzukii*, or Spotted Wing Drosophila, Recorded in Southeastern Pennsylvania, U.S.A. *Entomological News*, *123*(1), 71-75.

Freda, P. and Braverman, J. 2013. Temporal Study of Genetic Variation at *COI* in a Wild Population of *Drosophila suzukii*. Unpublished manuscript in preparation.

Springer, C. J., Freda, P. J., Healy, B. E., Ward, J. K. and Braverman, J. M. 2013. QTL Analysis Reveals Novel Loci for Plant Development and Reproductive Traits under Elevated CO2 in *Arabidopsis thaliana*. Unpublished manuscript in preparation.

Freda, P. and Braverman, J. 2013. An efficient, practical, and reliable *Drosophila* trap. Unpublished manuscript in preparation.

Gene annotation research project: Genomics Education Partnership (GEP), Saint Joseph's University, 2012

- Participated in a collaboration between a growing number of institutions and the Biology Department and Genome Center of Washington University in St. Louis.
- The project's goal, using a wide range of bioinformatics tools, is to annotate *Drosophila erecta* genes using *D. melanogaster* as a reference species.
- Personally submitted annotation reports for three *D. erecta* protein coding genes to the GEP.
- Publication in preparation.

Meghan M. M., London, S. C., Angelucci, V. C., Burke, S. M., Del Buono, M., Dell'Arciprete, A. M., Eastman, J. M., Freda, P. J., Giacobbo, A. J., Harrison, J. N., Leconey, B. A., Martino, V. L., Mengel, T. A., Patel, C. V., Puetz, W. J., Robinson, L. M., Senss, A. M., Southwell, M. J., Thelmo, F. L., Turro, K. N., Vilbert, A. C., Weiss, W., King-Smith, C., Braverman, J. and Lee-Soety, J. Y. Estimating Phage Genome Sizes by Pulsed-Field Gel Electrophoresis for Preliminary Cluster Identification. Poster presentation. Fifth Annual SEA-PHAGES Symposium. Janelia Farm Research Campus, Ashburn, VA. June 7-9, 2013.

Castro, R., DiMeglio, M., Freda, P. and Braverman, J. 2013. *Drosophila* Biodiversity on the Campus of Saint Joseph's University. Sigma Xi Research Symposium Poster, Saint Joseph's University, April 19th, 2013.

Freda, P. and Braverman, J. 2012. *Drosophila* Biodiversity on the Campus of Saint Joseph's University. Sigma Xi Research Symposium Poster, Saint Joseph's University, April 13th, 2012.

Freda, P., Springer, C. and Braverman, J. 2011. Computational Study of Flowering Time Genetics with QTL Cartographer. Sigma Xi Research Symposium Poster, Saint Joseph's University, April 8th, 2011.

*Columnist, "*Practical Science with Phil Freda" - Patch.com, Upper Moreland-Willow Grove Patch, 2010-2012: uppermoreland.patch.com/users/philip-freda

- *Articles available upon request*

Grants and Fellowships

- HHMI funding for graduate assistantship
- HHMI funding for GeoKids LINKS (GK-12) Fellowship

Relevant Coursework

Evolution
Bioinformatics
Organismal Biology
Cell Biology
Genetics
General Chemistry I and II
General Physics I and II
Graduate Seminar*
Microbiology
Research Techniques
Global Climate Change and Disease
Biology of Insects
Molecular Genetics
Organic Chemistry I and II
Applied Calculus

*Topics: Interspecific chemical communication ❖ Biological structures ❖ Biotechnology

Technical Proficiencies

- Proficient in most operating systems including Windows 2000/XP/Vista/7, Mac OSX, and LINUX/UNIX (Ubuntu).
- Bioinformatics software knowledge includes QTL Cartographer, Mesquite, Geneious, MEGA, NCBI Blast, DnaSP, and Flybase.

Affiliations and Memberships

Associate Member: Sigma Xi Scientific Research Society, 2013-Present

References available upon request