The Genomics Education Partnership: Democratizing Genomics Research Experiences Nationwide

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"You can always learn the basics of genetics through PowerPoint slides and textbooks; however, you don't fully grasp the beauty and minute complexity of the genetic code until you are tasked with unraveling it, and further, drawing meaning from it." ~ GEP Student

Introduction

The Genomics Education Partnership (GEP) is a **nationwide** faculty-driven collaboration of 250+ members working to ensure all undergraduates, regardless of their background & available resources, can participate in genomics research via **Course-based Undergraduate Research Experiences (CUREs)**.

Since projects are accessible through the internet, no local research infrastructure is needed to participate in the GEP; thus, **GEP is a cost-effective way for faculty & institutions to provide opportunities for students to participate in genomics research**. In the GEP computer-based CURE, students experience **"hands-on"** how to use web-based genome browsers, bioinformatics tools, & databases to investigate eukaryotic genes & genomes based on empirical (e.g., RNA-Seq data) & computational (e.g., gene predictions, sequence alignments) evidence.

Projects

Gene annotation is the process of indicating the location, structure, & identity of genes in a genome.

Students must **evaluate** the available evidence, **create** the best gene model, & **defend** their conclusions.

- Expansion of the Muller F element in *Drosophila*
- Evolution of insulin pathway genes across *Drosophila*
- Evolution of venom genes in parasitoid wasps
- Annotating genes in the critically endangered Puerto Rican parrot

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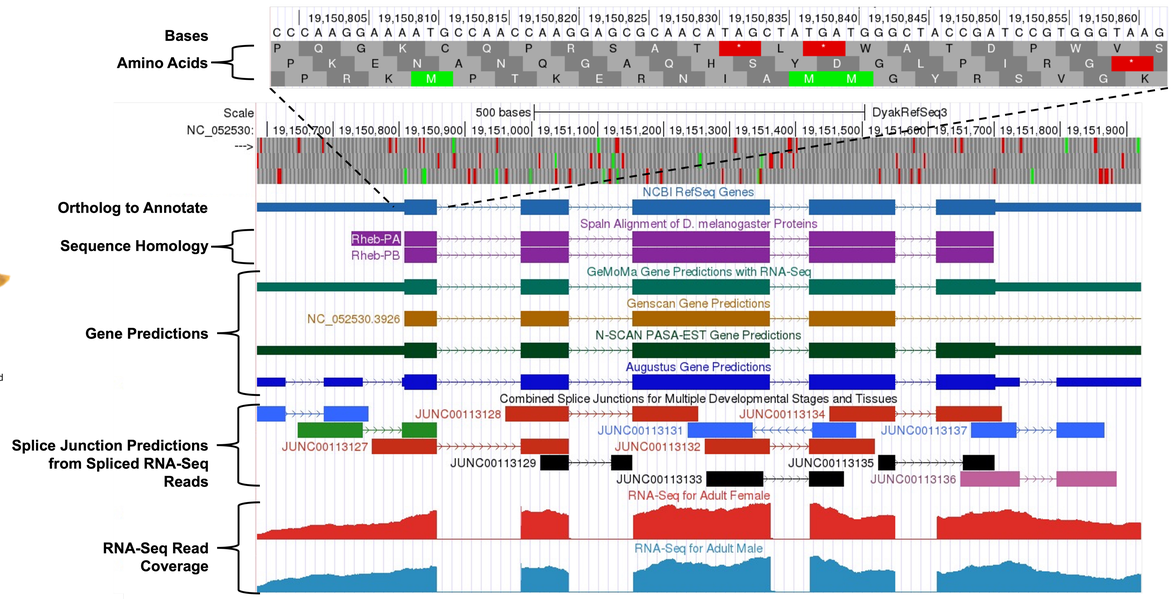
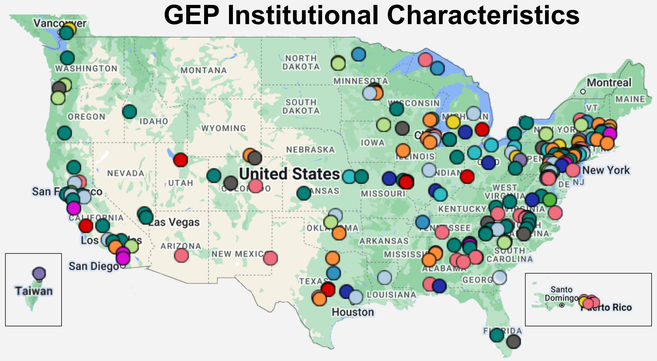


***Drosophila yakuba* GEP UCSC Genome Browser**

Institutions

GEP Institutional Characteristics



Flexible implementation strategies & ready-made curricula have allowed faculty from a variety of institutions to easily integrate GEP research projects into beginning & advanced biology courses.

- 215 Institutions
  - 47 Minority-Serving Institutions
    - 36 Hispanic-Serving Institutions
    - 11 Historically Black Colleges and Universities
  - 26 Community Colleges
  - 146 Primarily Undergraduate Institutions
  - 33 Research Universities

As of October 31, 2022

Benefits

Faculty

- Curriculum & projects for easy integration
- Flexible implementation (short modules or CURE)
- Teaching & technical support from community
- Professional development (Science & Teaching)
- Opportunities to present & publish

Students

- Engage in novel research within a course
- Gain marketable skills in critical thinking/big data
- Virtual peer tutor available 7 days/week
- Opportunities to co-author publications
- Improve comprehension of genomics concepts

Institutions

- NO COST curriculum, training, & technical support
- Only requires access to computer & internet
- Incorporates best practices in science education
- Provides undergraduate research opportunities
- Research infrastructure isn't needed

Conclusion

The GEP is actively **recruiting new members**, especially faculty at Minority-Serving Institutions & Community Colleges. The GEP hosts free in-person & virtual New Member Trainings throughout the year.

If you are **interested in joining our Partnership**, let us know by completing the "Contact" form on the GEP website (thegep.org/contact).

thegep.org/contact

thegep.org

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This poster is based upon work supported by the National Science Foundation (1915544) & National Institute of General Medical Sciences of the National Institutes of Health (R25GM130517) to LKR.

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3,396+ students participated in 2021/2022