**Bioinformatic Databases**

**The University of Toledo**

**Program in Bioinformatics & Proteomics/Genomics**

**BIPG5400/7400 Bioinformatic Databases, Section 001, CRN #33968**

**Instructor**: Alexei Fedorov, PhD

**Email**: Alexei.fedorov@utoledo.edu

**Office Hours**: Tue/Thu 11:00/11:55 am.For other time please request an appointment via email ([alexei.fedorov@utoledo.edu](mailto:alexei.fedorov@utoledo.edu)) at least one day in advance.

**Office Location**: BHS 308 or via Skype (Afedorov\_lab)

**Instructor Phone**: 419-383-5270

**Offered**: Summer 2021

**Course Website**: [Blackboard Learn](https://blackboard.utdl.edu/)

**Class Location**: Online lectures

**Class Day/Time**: Online lectures

**Lab Location**: 127 HEB

**Lab Day/Time**: TBA

**Credit Hours**: 1 cr

**SPECIAL COURSE EXPECTATIONS DURING COVID-19**  
**ATTENDANCE**  
**The University of Toledo has a missed class policy. It is important that students and instructors discuss attendance requirements for the course. Students must perform a daily health assessment,** based on based on [**CDC guidelines**](https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html)**,** before coming to campus each day, which included taking their temperature. Students who are symptomatic/sick should not come to class and should contact the Main Campus Health Center at 419-530-3451.  *Absences due to COVID-19 quarantine or isolation requirements* ***are****considered excused absences*. Students should notify their instructors and these absences may not require written notice.  
FACE COVERINGS  
All students must wear face coverings while on campus, except while eating, alone in an enclosed space, or outdoors practicing social distancing. NO students will be permitted in class without a face covering. If you have a medical reason that prevents you from wearing a face covering due to a health condition deemed high-risk for COVID-19 by the Centers for Disease Control and Prevention (CDC), you should submit a request for an accommodation through the Student Disability Services Office (SDS) by completing the [online application](https://teton.accessiblelearning.com/Toledo/). Students will need to provide documentation that verifies their health condition or disability and supports the need for accommodations. If a student is already affiliated with SDS and would like to request additional accommodations due to the impact of COVID-19, should contact their accessibility specialist to discuss their specific needs.    
SOCIAL DISTANCING   
Students should practice social distancing inside and outside the classroom please follow signage and pay attention to the seating arrangements. Do not remove stickers or tape from seats and/or tables, this is there to provide guidance on the appropriate classroom capacity based on the recommended 6 feet of social distancing between individuals. Please be conscious of your personal space and respectful of others. Also be cognizant of how you enter and exit the room; always try to maintain at least 6 feet of distance between yourself and others.  
DESKS AND WORK SPACES  
Students will need to sanitize their desks and/or work space before class with the University provided sanitizing spray and paper towels their desks.   
SPECIAL NOTES  
It’s important to note that based on the unpredictability of the COVID-19 virus things can change at any time so please be patience and understanding as we move through the semester. I also ask that you keep me informed of concerns you may have about class, completing course work/assignments timely and/or health concerns related to COVID.

CATALOG/COURSE DESCRIPTION

All procedures related to current COVID-19 requirements will be engaged. Currently, no conventional seminars/lectures will be given upon requests from several students. Thus, all teaching activities will be provided via online Blackboard web site and Collaborate Ultra facilities. Online lectures/seminars will be every Tuesday and Thursday from 12:00 pm till 1:30 pm starting from May 18, 2021

The main goal for this study is to investigate numerous human mutations using public Databases. Students will try to evaluate possible effects of these mutations on phenotypes. Population Genetics rules will be applied and discussed. Several GWAS studies will be evaluated.

During the first part of this project, students will intensively work with one of the largest databases – “1000 Genomes” using on-line tools and also as downloadable *vcf* text files of “1000 Genomes” in local UT computers. Students will learn how to analyze structure of SNP haplotypes in human genes and evaluate the frequency of these haplotypes across populations.

During the second part of this project, the students will work with the next-generation sequencing mRNA databases – so-called the Sequence Read Archive (SRA), using on-line NCBI browser. The goal of this research is to analyze the expression of a particular genomic region in different human tissues and at different conditions.

During one month Dr. Fedorov will supervise the students in this project in his laboratory. The time is flexible. One credit hour for this course corresponds to 5 weeks of LABs.

Students will be expected to take the MOOC online Database course ( <http://www.coursetalk.com/stanford-online/sql> ) in order to gain SQL experience. Additional credit may be earned for this activity.

PREREQUISITES AND COREQUISITES  
None

TECHNOLOGY REQUIREMENTS   
Computer with internet connection, current browser, Microsoft Office (or other software that can save documents in .docx, .xlsx, and .pptx formats).

ACADEMIC POLICIES   
[Graduate Policies](file:///G:\FunBio20\Graduate%20Policies): <http://www.utoledo.edu/policies/academic/graduate/>

## UNIVERSITY POLICIES

### Policy Statement on Non‐Discrimination on the Basis of Disability (ADA)

The University is an equal opportunity educational institution. Please read [The University’s Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.](http://www.utoledo.edu/policies/administration/diversity/pdfs/3364_50_03_Nondiscrimination_o.pdf)   
Students can find this policy along with other university policies listed by audience on the [University Policy webpage](http://www.utoledo.edu/policies/audience.html/#students) (http://www.utoledo.edu/policies/audience.html/#students).

<https://www.utoledo.edu/title-ix/policies.html> <https://www.utoledo.edu/policies/administration/diversity/pdfs/3364_50_01.pdf>

<https://www.utoledo.edu/policies/main_campus/student_life/pdfs/3364_30_04_Student_code_of_conduct.pdf>

### Academic Accommodations

The University of Toledo embraces the inclusion of students with disabilities. We are committed to ensuring equal opportunity and seamless access for full participation in all courses. For students who have an accommodations memo from Student Disability Services, I invite you to correspond with me as soon as possible so that we can communicate confidentially about implementing accommodations in this course. For students who have not established affiliation with Student Disability Services and are experiencing disability access barriers or are interested in a referral to healthcare resources for a potential disability or would like information regarding eligibility for academic accommodations, please contact the [Student Disability Services Office](http://www.utoledo.edu/offices/student-disability-services/index.html) (http://www.utoledo.edu/offices/student-disability-services/) by calling 419.530.4981 or sending an email to [StudentDisability@utoledo.edu](mailto:StudentDisability@utoledo.edu).

## ACADEMIC AND SUPPORT SERVICES

Please follow this link to view a comprehensive list of [Student Academic and Support Services](http://www.utoledo.edu/studentaffairs/departments.html) (http://www.utoledo.edu/studentaffairs/departments.html) available to you as a student.

## SAFETY AND HEALTH SERVICES FOR UT STUDENTS

Please use the following link to view a comprehensive list [Campus Health and Safety Services](http://www.utoledo.edu/offices/provost/utc/docs/CampusHealthSafetyContacts.pdf) available to you as a student.

COURSE SCHEDULE

**Example of the schedule from 2020:**

L1. Introduction to Databases 1h14m.

L2. SNP analysis, Gene-arrays and chips. Finding a mutation that caused Retinitis Pigmentosa. 1h7m .

L3. SRA database of RNA-seq public data. 1h2m .

L4. NONCODE Database of lincRNAs. Ensemble Database of human-mouse whole genome alignments. Errors in database interpretations. README files. 1h1m.

L5. SNP Databases (dbSNP, 1000Genomes, SNPedia, ClinVar, GTEx Portal). 1h27m.

L6. 1000 Genomes Project, online databases and tools. Lecture. 1h17m.

L7. Analysis of GWAS databases 59m June.

L8. Discussion of HWs #3, 5, 6 (41m) + Online lecture about VCF format, which is most common for genomic databases (40m) .

L9. Analysis of FTO gene (structure, functioning and evolution) using NCBI on-line databases and tools 1h10m.

L10. Essential questions about FTO gene. 1h4m.

L11. Final project for RNA-Seq data interpretations. 1h30m.