The biomedical program has three components—class, journal clubs, and lab. Class will meet in the Levin Auditorium, will begin at 9:00 AM and will run until 11:00 AM. Journal club meetings will be scheduled by the journal club leaders between the hours of 11:15 AM and 1:15 PM. Each journal club will meet for one hour during this time period. Lab begins at 1:30 PM and will usually run until 4:30 PM.

Executive Director and Lab Coordinator: Linda Robinson, PhD, Adjunct Assistant Professor Instructional Laboratory Coordinator Department of Biology, University of Pennsylvania linda3@sas.upenn.edu

Director and Lecturer: Kieran Dilks, PhD, Penn Biology PhD High School Teacher, Haddonfield Memorial High School (NJ) kdilks@sas.upenn.edu

Teaching Assistant: Jessica Ardis jardis@sas.upenn.edu

Assist. Lab Coordinator: Svetlana Kozik

Labs:
Lab Section A: Levin L11
Lab Instructor: Lori Spindler
Lab Assistant: Run Jin

Lab Section B: Levin L12
Lab Instructor: John Wagner
Lab Assistant: Vinayak Mathur

Lab Section C: Leidy 114
Lab Instructor: Aurora MacRae-Crerar
Lab Assistant: Jessica Ardis

Lab Section D: Leidy 115
Lab Instructor: Maurice Baynard
Lab Assistant: Renee Hastings
Course Materials:

Students will receive lab manuals and copies of assigned journal club articles. Each student should also have a notebook, folder, pens/pencils, and calculator, and should bring a laptop computer if you have one. Closed-toed shoes must be worn for afternoon laboratories.

Schedule of Class Topics, Guest Talks and Laboratories

Monday, July 8th
9-10 AM: Orientation to Program
10 -11 AM: Introductory Lesson – What is Biomedical Research?

Lab: Module 1 (Recombinant DNA): Introduction, Safety, Introduction to Module 1, Design promoters

Tuesday, July 9th
9-10 AM: Biomedical Research Ethics
10-11 AM: Guest Research Talk – Dr. Mary Regina Boland

Lab: Module 2 (Bradford Protein Assay): Pipetting, Introduction to Module 2, Bradford Protein Assay

Wednesday, July 10th
9-10 AM: Biomedical Research Ethics
10-11 AM: Guest Research Talk – Dr. Brian Gregory

Lab: Module 3 (Blood Typing): Introduction to Module 3; Isolate cheek cell DNA, set up PCRs (Exon 6, Exon 7, Rh factor)

Thursday, July 11th
9-10 AM: Biomedical Research Techniques
10-11 AM: Guest Research Talk - Dr. Nancy Spinner

Lab: Module 3 (Blood Typing): Set up restriction digests of Exon 6 and Exon 7 PCRs, Rh factor gel electrophoresis; PCR exercises

Friday, July 12th
9-10 AM: Going from Experiment to Model
10-11 AM: Guest Research Talk - Dr. Jillian Whelan

Lab: Module 3 (Blood Typing): Exon 6 gel electrophoresis; Analysis of Results from Rh factor gels; Restriction enzyme + electrophoresis exercise
Monday, July 15th

9-10 AM: Guest Research Talk – Dr. Courtney Comar
10-11 AM: Guest Research Talk – Dr. Scott Poethig

**Lab:** Module 1 (Recombinant DNA): GGA cloning with ordered oligos, paper activity, Restriction enzyme challenge activity

Tuesday, July 16th

9-10 AM: The Birth and Maturation of the Molecular Dogma
10-11 AM: Guest Research Talk – Dr. Nancy Bonini

**Lab:** Module 1 (Recombinant DNA): Transformations, transformation exercise

Wednesday, July 17th

9-10 AM: Analyzing Nucleic Acids: Diagnostics and Discovery
10-11 AM: Guest Research Talk – Dr. Brian Keith

**Lab:** Module 3 (Blood Typing): Exon 7 gel electrophoresis, Analysis of Results from Exon 6 gels, Genetics of Blood Type Worksheet

Thursday, July 18th

9-10AM: Antibiotic Resistance: Time to Panic?
10-11 AM: Guest Research Talk – Dr. Ishmail Abdus-Saboor

**Lab:** Module 3 (Blood Typing): Blood Typing Results and Conclusions

Friday, July 19th

9-10 AM: Molecular Talk Among Viruses Allow Them to Make “Informed” Biological Decisions
10-11 AM: Guest Research Talk - Dr. Michael Lampson

**Lab:** Module 1 (Recombinant DNA): Pick colonies for cultures, Colony PCR, Phenotype analysis (Image J), Estimation of Transformation Efficiency

Monday, July 22nd

9-10 AM: CRISPR: The Bioengineering Game Changer
10-11 AM: Cancer: Three Rights Make a Left
Lab: Module 1 (Recombinant DNA): Clean up PCR, submit for sequencing, Compare ImageJ results and color intensity in cultures versus promoter sequences, Module 1 Results and Preliminary Conclusions

Tuesday, July 23rd
9-10 AM: Guest Research Talk – Dr. Doris Wagner
10-11 AM: Guest Research Talk – Dr. Erol Akçay

Lab: Module 4: (ELISA) Enzyme-linked Immunosorbent Assay (ELISA) to Track a Simulated Disease Outbreak

Wednesday, July 24th
9-10 AM: The Microbiome as an Ecosystem
10-11 AM: Guest Research Talk – Dr. Kazuko Nishikura

Lab: Module 1 (Recombinant DNA): Align sequences, Module 1 Results and Conclusions

Thursday, July 19th
STUDENT JOURNAL CLUB PRESENTATIONS

Friday, July 20st
STUDENT JOURNAL CLUB PRESENTATIONS

Evaluation:

Class
Students will be evaluated based on performance on in-class questions

Lab
Students will be evaluated on lab performance. They will also turn in portions of their lab manuals to their Lab Instructors.

Journal Clubs
Students will be evaluated on participation in a small group journal club where they will read and discuss primary scientific literature and then use this information to prepare a group presentation at the end of the program.