



ACEGID

African Centre of Excellence for Genomics of Infectious Disease
Redeemer's University, Nigeria

Foundational Training Workshop in Genomics

Sabeti Lab

Cambridge, Massachusetts USA

June 26, 2017 - August 10, 2017

SCIENCE COMMUNICATION • LAB PROCEDURES • MOLECULAR BIOLOGY THEORY

The Foundational Training Workshop in Genomics is a full-immersion residential program designed for top-performing West African graduate and postdoctoral students, faculty members and laboratory technicians. The two-month training offers a curriculum of best practices and laboratory techniques, reinforced by intensive coursework in molecular biology, genetics, and genomics theory to support their professional development toward becoming independent scientists.

TENTATIVE SCHEDULE

- Week 1: Introduction to Molecular Biology
- Week 2: Population Genetics & Molecular Genetics
- Week 3: Personal Genomics

- Week 4: Microbial Metagenomics
- Week 5: Diagnostic Technology & Next Gen Sequencing
- Week 6: Data Analysis & Computing
- Week 7: Future of Outbreak Response Symposium

LECTURES

- Mendelian Genetics & Meiosis
- Mutations & their Detections
- PCR Primer Design
- Sanger Sequencing
- RDA Data Analysis
- mtDNA Analysis
- Next Gen Sequencing vs. CE
- Genome Sequence Analysis
- Metagenomic Studies

WORKSHOPS

- Quantitative PCR
- Zolgen Labs immunoassay diagnostics
- Dimagi mobile case enrollment platform
- Human research subjects ethics
- DNAnexus bioinformatic sequencing pipeline
- Intro epidemiology
- General virology
- Eppendorf pipette calibration & technique

LABS

- Bacterial Genomics: Microbiome Collection
- Phylogenetic Trees: Using Genomics to Track the Spread of Infectious Diseases
- Using Geneious Software: Molecular Biology & NGS Analysis Applications
- DNA Extraction, PCR Purification & Sequencing
- RFLP Genotyping Analysis: Data Collection & Analysis

FUTURE OF OUTBREAK RESPONSE SYMPOSIUM

The summer capstone event, the symposium connects stakeholders from across the infectious disease space with the common mission of transforming outbreak response to share advances in surveillance, diagnostics, human and pathogen genomics and information systems. Trainees in the Advanced Sequencing program deliver scientific talks and present their results; foundational students introduce and premiere their training videos; and site PIs are featured speakers.



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2017 SUMMER PROGRAM APPLICATION

PERSONAL INFORMATION

GIVEN (FIRST AND MIDDLE) NAME:	FAMILY (LAST) NAME:
DATE OF BIRTH (MM/DD/YYYY):	COUNTRY OF BIRTH:
COUNTRY OF CITIZENSHIP:	COUNTRY OF PERMANENT RESIDENCE:
GENDER (AS LISTED ON PASSPORT): M <input type="checkbox"/> F <input type="checkbox"/>	MARITAL STATUS:
PERMANENT ADDRESS:	
MAILING ADDRESS:	
PHONE NUMBER:	EMAIL ADDRESS:
CURRENT POSITION:	SUPERVISOR:
INSTITUTION:	
HIGHEST DEGREE EARNED:	YEAR RECEIVED:
EDUCATIONAL INSTITUTION:	

TRAVEL DOCUMENTS

DO YOU HAVE A CURRENT PASSPORT? YES <input type="checkbox"/> NO <input type="checkbox"/>	DATE OF EXPIRATION (MM/DD/YYYY):
HAVE YOU EVER TRAVELED TO THE UNITED STATES? YES <input type="checkbox"/> NO <input type="checkbox"/>	
DO YOU HAVE A CLOSE RELATIVE WHO IS A US CITEZEN/ PERMANENT RESIDENT? YES <input type="checkbox"/> NO <input type="checkbox"/>	
WHAT IS YOUR RELATIONSHIP TO THIS U.S. CITIZEN/PERMANENT RESIDENT?	
HAS AN APPLICATION FOR PERMANENT RESIDENCE EVER BEEN FILED ON YOUR BEHALF? YES <input type="checkbox"/> NO <input type="checkbox"/>	
AT WHAT CONSULATE/EMBASSY WILL YOU APPY FOR AN ENTRY VISA?	

EMERGENCY CONTACT

NAME OF PERSON TO CONTACT IN CASE OF EMERGENCY:	
PHONE NUMBER:	RELATIONSHIP:

FOUNDATIONAL TRAINING WORKSHOP IN GENOMICS ASSESSMENT

Please take a moment to answer a few basic questions about genetics and your goals for the workshop. Your answers will not affect your participation in the program in any way. This assessment will only be used to understand how to best prepare course material for the range of backgrounds and experiences of participating students. Please answer each question on your own, without the help of a partner or computer. If you do not know the answer, please leave that question blank.

2) How are RNA and DNA different?

1) The following is the sequence of a short strand of DNA that is the template for transcription:

5' - ACGATAGCGATGAT - 3'

What is the sequence of the RNA that would be made using this DNA strand as the template?

- a) 5' - ACGATAGCGATGAT - 3'
- b) 5' - ACGAUAGCGAUGAU - 3'
- c) 3' - TGCTATCGCTACTA - 5'
- d) 3' - UGCUAUCGCUACUA - 5'

- 2) Shown below is 585bp of a DNA sequence. The sequence you wish to amplify via PCR is indicated in **[bold]** and surrounded by brackets.

Design a pair of primers that would amplify the desired region. Once you've designed your primers, indicate where in the sequence they would bind. Remember to indicate the 5' and 3' ends of your primers.

5' -

AGCAAAGATACTACCAAGCCCTGCGGAGCAAGGTACCTCACACTTC
ATGAGCGAGTTAAGATGGGTTTCACAATTTTTCAAGCAAGGAAACGG
GCTCGGAGGTCTTGAACACCTGCTACCCAATAGCAGAACAGCTACTGG
AACTAAAATCCTCTGATT[**TCAAATAACAGCCCCGCCC**ACTACCACT
AAGTGAAGTCATCCACAACCACACACCGACCACTCTAAGCTTTTG
TAAGATCGGCTCGCTTTGGGGAACAGGTCTTGAGAGAACATCCCT
TTAAGGTCAGAACAAAGGTATTTTCATAGGTCCAGGTCGTGTCC
CGAGGGCGCCACCCAAACATGAGCTGGAGCAAAAAGAAAGGGA
TGGGGGACTTGGAGTAGGCATAG]GGGCGGCCCTCCAAGCAGGGT
GGCTGGGACTCTTAAGGGTCAGCGAGAAGAGAACACACACTCCAGC
TCCCGCTTTATTCGGTCAGATACTGACGGTTGGGATGCCTGACAAGGA
ATGGTCCTTTTCGCCACACTGAGACATACCCGCAGCTACCCACCCAGGC
CTGACTTAGTCTGGTACTGGACTTTTAGG - 3'

Primer 1: _____

Primer 2: _____

Briefly explain what you considered to get to this answer.

- 3) A strain of *Drosophila melanogaster* is heterozygous at two genes, the A and B gene. These genes are located on two separate chromosomes.

Given this fly's genotype (Aa;Bb), which of the following is the correct set of possible gametes that would be produced after meiosis in this fly.

- a) AA, Aa, BB, Bb
- b) A, B, a, b
- c) AB, ab, AB, ab
- d) aa, bb, BB, AA
- e) AB, Ab, aB, ab

- 4) A longhaired male cat mates with a longhaired female cat. They produce 12 offspring, 9 of which have longhair and 4 of which have short hair. Briefly explain how it is possible for two longhaired cats to produce offspring that have short hair?

- 8) Briefly explain how you think genetics and molecular biology can be used to study infectious disease.

5) What are your goals for the program? Briefly describe what you would like to learn during your time in the ACEGID summer program.

6) Briefly describe an experiment that you would like to be able to do after the program?

7) Briefly explain your current role and how you use genetics in your daily work.

Please complete the following questions only if you will be attending the **Advanced Sequencing Training**:

1) Describe your past experience with sequencing. ie: Have you prepared sequencing libraries? Have you run any sequencing instruments?

2) How do you plan to use the knowledge gained during the advanced sequencing training. Do you have a sequencer in your lab? Will you be preparing sequencing libraries in the future?

ACKNOWLEDGEMENT OF RISK AND RELEASE
for
**Non-Harvard Personnel Using Harvard Research and Instructional Laboratory
Facilities**

*THIS IS A RELEASE OF LEGAL RIGHTS –
PLEASE READ AND UNDERSTAND BEFORE SIGNING*

I, the undersigned, accept and agree to the following terms and conditions in consideration for my use of Harvard's research and instructional laboratory facilities.

1. Access to Facilities. The facilities are being made available to me as an educational or research opportunity. I am not a student, employee or affiliate of Harvard.
2. Health and Safety Risks. I understand that Harvard laboratories may contain hazardous substances and equipment. I will take every precaution necessary to protect my health and safety, and the health and safety of others. I will acquaint myself with and conduct my activities in accordance with all safety rules and safe operational procedures. If I am not familiar with or I do not know how to handle safely a substance or piece of equipment, I will seek assistance from qualified Harvard personnel. I recognize that I may be subjected to potential risks, illnesses and injuries. I have made my own investigation of these risks, understand these risks and assume them knowingly and willingly.
3. No Medical Coverage. I understand that if I am injured as a result of my activities at Harvard, I am not covered by Harvard insurance of any kind. It will be my responsibility to pay for emergency room care, doctors' services, hospitalization, and any other related costs, medical or non-medical. I will not be eligible to participate in Harvard's health, disability or life insurance program.
4. Appropriate Conduct. I agree to observe all applicable governmental, University and departmental policies, rules and regulations that pertain to my conduct on campus and in the facilities. I agree that Harvard officials may require me to leave the facilities if they believe that I have violated a policy, rule or regulation or if they believe that my conduct is inappropriate.
5. Confidentiality. I agree not to disclose or to use, directly or indirectly, any proprietary or confidential research, data, trade secrets or other similar information of which I may become aware as a result of my activities in Harvard's facilities.

6. ASSUMPTION OF RISK AND RELEASE OF CLAIMS. Knowing the risks described above, I agree, on behalf of my family, heirs and personal representative(s), to assume all the risks and responsibilities surrounding my use of and access to Harvard's laboratories. To the maximum extent permitted by law, I release, hold harmless and agree to indemnify Harvard, its current and former officers, directors, faculty, staff, representatives, volunteers, employees, students, other trainees and agents, and their respective heirs and assigns, from and against any present or future claim, loss or liability for injury to person or property which I may suffer, or for which I may be liable to any other person, related to my use of- and access to the laboratories, resulting from any cause including but not limited to negligence by Harvard, its current or former directors, officers, faculty, staff, representatives, volunteers, employees, students, other trainees or agents.

I have carefully read this Acknowledgement of Risk and Release before signing it. This agreement shall be governed by the laws of the Commonwealth of Massachusetts (excluding its conflict of laws principles), which shall be the forum for any lawsuits filed under or incident to this release or the attached Harvard University Visitor Participation Agreement.

Signed: _____ Date: _____

Name (print) _____

Date of Arrival: _____ Anticipated Date of Departure: _____

HARVARD UNIVERSITY VISITOR PARTICIPATION AGREEMENT
for visitors from foreign non-profit institutions and for unaffiliated individuals

In consideration of my participation in research or other projects of President and Fellows of Harvard College ("Harvard" or the "University") and/or my use of funds, facilities or other resources provided by or through Harvard (collectively, "Harvard Activities"), I agree as follows:

- 1) With respect to my Harvard Activities, I acknowledge that I am bound by and will comply with Harvard's research policies (among them, the "Statement of Policy in Regard to Intellectual Property," or "IP Policy"), as they may be amended from time to time and made available by Harvard at <http://vpr.harvard.edu/pages/research-policies-guidance> or otherwise.
- 2) If any agreement between Harvard and a third party (*e.g.*, with respect to research funding or collaboration, or the use of materials, data, rights, equipment or the like) pertains to my Harvard Activities, I will abide that agreement, to the extent its terms apply and are made known to me.
- 3) I will report promptly to Harvard's Office of Technology Development ("OTD") any Invention, Sponsored Computer Software and/or Unpatented Material, as those capitalized terms are defined in the IP Policy, here referred to together as "Developments", that the IP Policy requires me to disclose to Harvard. I hereby assign and agree to assign to Harvard all my right, title and interest in all Developments that Harvard is entitled to own under the IP Policy, and all patent rights, copyrights and other intellectual property rights in those Developments throughout the world. I hereby grant to Harvard any rights required to be granted to Harvard under the IP Policy with respect to Incidental Inventions (as defined in the IP Policy) or other Developments I am entitled to own.
- 4) If any agreement between Harvard and a third party requires that my copyrights in works of authorship (for example, research reports or articles) be assigned or licensed to Harvard or a third party, I hereby assign or license to Harvard the copyrights that are needed in order to fulfill the agreement.
- 5) I will cooperate with Harvard in such reasonable steps as may be needed to carry out its research policies and to confirm, establish or protect the rights of Harvard or its designees. This may include, for example, executing additional documents, assisting in the filing, prosecution or defense of patent applications, and letting Harvard see my research data or materials as needed to respond to inquiries or conduct internal and external oversight activities.
- 6) I will not in future make with any third party any agreement that conflicts or reasonably could be construed as conflicting with the terms of this Agreement. I have not, as of the current date, made such an agreement or, if I have, I have secured from the relevant third party a release of any obligations that conflict or reasonably could be construed as conflicting with my obligations hereunder.
- 7) The obligations of this Agreement relating to my Harvard Activities will continue after the end of those Activities. This Agreement is binding on me, my estate, heirs and assigns.

By signing in the space provided below, I hereby accept and agree to the terms and conditions of this Agreement:

Signature: _____

Name: _____

Date: _____

and, if applicable,

Home
Institution: _____



2017 SUMMER PROGRAM APPLICATION

INSTRUCTIONS

Please return the following documents via post or email to the Sabeti Lab:

APPLICATION

ASSESSMENT

ACKNOWLEDGEMENT OF RISK AND RELEASE

HARVARD UNIVERSITY VISITOR PARTICIPATION AGREEMENT

A COPY OF YOUR PASSPORT

A COPY OF YOUR CV

Mailing Address:

Broad Institute

Attn: Megan Purdum

Office 6105

75 Ames Street

Cambridge, MA 02142

Email: mpurdum@broadinstitute.org