

# CURRICULUM VITAE

## Wangui Mbuguiro

wmbuguiro@gmail.com

### EDUCATION:

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Johns Hopkins School of Medicine, Baltimore, MD August 2017 – Present  
PhD in Biomedical Engineering, NSF Graduate Research Fellow

Massachusetts Institute of Technology, Cambridge, MA August 2013 – June 2017  
BS in Biological Engineering

### BIOMEDICAL RESEARCH:

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*Graduate Researcher* August 2017 – Present  
PI: Feilim Mac Gabhann Johns Hopkins

- Developing computational models of immune signaling to understand and treat endometriosis
- Simulating cell signaling within in vitro/vivo experiments using differential equations in MATLAB
- Analyzing experimental data and developing apps for interactive data exploration in R

*Undergraduate Researcher* January 2016 – June 2017  
PI's: Ron Weiss, Linda Griffith MIT

- Designed and developed DNA to create a less invasive molecular diagnostic for endometriosis
- Optimized transfection of human endometrial cells for an in vitro endometriosis model
- Coordinated team of 12 scientists to conduct and document project: [2016.igem.org/Team:MIT](http://2016.igem.org/Team:MIT)

*Visiting Undergraduate Researcher* June – August 2014  
PI: Ross Levine Memorial Sloan Kettering Cancer Center, NY

- Designed cloning experiments to create an in vitro model of secondary acute myeloid leukemia
- Led two discussions on published research studies and participated in weekly journal clubs

*Research Intern* August 2012 – August 2013  
PI: Michele Schaefer Johns Hopkins

- Investigated inflammation in blast-induced traumatic brain injury
- Conducted mice blast experiments and surgery to evaluate various protective equipment
- Collected and analyzed data using immunohistochemistry and stereological methods

### AWARDS:

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Biotechnology Scholar, Science Mentorship & Diversity Program, 2020  
William and Mary Drescher Graduate Medical Research Award, 2017  
National Science Foundation Graduate Research Fellowship Recipient, 2017  
Gold Medal, Nominations for Best Poster and Best Composite Part, International Genetically  
Engineering Machine Competition 2016  
Martin L. and Sarah F. Leibowitz Fellowship for Outstanding Research, 2014  
WJZ-TV Black History Month Oratory Contest Semifinalist, 2013  
National Achievement Scholarship Finalist, 2013

## PUBLICATIONS:

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Xu, L., Schaefer, M.L., Linville, R.M., Aggarwal, A., **Mbuguiro, W.**, Wester, B.A., Koliatsos, V.E. (2016). Neuroinflammation in primary blast induced neurotrauma: Time course and prevention by torso shielding. *Experimental Neurology*, 277:268-74. <https://doi.org/10.1016/j.expneurol.2016.01.010>

## PRESENTATIONS:

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**Wangui Mbuguiro.** "Modeling Endometriosis Mechanistically." 2019 Institute for Computational Medicine Annual Meeting (Oral).

**Wangui Mbuguiro,** Archis Bhandarkar, Trinh Nguyen, et al. "Genetic Circuit to Diagnose Endometriosis." 2016 International Genetically Engineered Machine Competition (Oral & Poster).

**Wangui Mbuguiro,** Mathew Cavuto. "Maker Health: Creating Personalized Biomedical Kits." 2015 World Maker Faire in New York (Demo).

**Wangui Mbuguiro,** Anna S. McKenney, Ross Levine. "Modelling transformation from Myeloproliferative Neoplasms to Acute Myeloid Leukemia." 2014 Leadership Alliance's National Symposium (Oral). 2014 American Society for Microbiology's Annual Biomedical Research Conference for Minority Students (Poster).

## TEACHING & MENTORSHIP:

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*Research Mentor* May 2018 – Present  
High school team in synthetic biology competition Baltimore Underground Science Space

- Mentored 2 cohorts of ~20 students from Baltimore City high schools as they designed, created, and analyzed biological systems to address medical challenges. Currently mentoring a 3<sup>rd</sup> cohort.
- Teaching 3-5 students each year principles of mathematical modeling and programming to improve their experimental design and explore practical applications of their project, using MATLAB
- Awarded Best Presentation and Best Measurement out of ~100 high school teams at the International Genetically Engineering Machine Competition (iGEM 2018-19)

*Teaching Assistant* January – March 2019  
Systems Pharmacology & Personalized Medicine, Instructor: Feilim Mac Gabhann Johns Hopkins

- Taught 36 undergraduate and graduate students' principles of systems pharmacology and aided in their development of 12 original mechanism-based pharmacological models of drug interactions, using MATLAB and R
- Co-wrote and graded 5 assignments, lead 20 office hours, and taught 3 lecture hours

*Instructor* January – March 2019  
Mathematical Modeling of Biology Course Baltimore Underground Science Space

- Created introductory workshop series on computational modeling in biology
- Designed three sets of lectures and exercises to guide participants through coding model simulations, optimizations, and sensitivity analyses using R programming language
- Received positive review from students: <http://www.bugssonline.org/computational-biology/>

*Instructor of Synthetic Biology Project Course* July 2017  
Program: Engineering Experience (E2) for Underrepresented Students in STEM MIT

- Created course to introduce 12 high school juniors to synthetic biology through designing, creating, testing, and presenting original biological solutions to a given challenge
- Guided students in techniques such as: restriction digest, ligation, transformation, plasmid isolation, gel electrophoresis, sanger sequencing, and spectrophotometry

*Teaching Assistant* December 2016 – May 2017  
Biological Circuit Engineering Lab, Instructors: Ron Weiss, Jacquin Niles MIT

- Assisted in preparing curriculum and materials to teach 19 undergraduate and graduate students principles of biological circuit design and production
- Taught students techniques such as DNA cloning, tissue culture, and quantitative flow cytometry

*Mentor and Tutor* September 2013 – May 2016  
Girls' Angle: A Math Club for Girls Cambridge, MA

- Challenged students with problems that encourage teamwork and creative problem solving
- Tailored problems to unique interests of ~25 students (ages 6-16)

## LEADERSHIP:

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*Communications Chair* June 2019 – Present  
Graduate Representative Organization Johns Hopkins

- Updates website with people, resources, and meeting information for graduate student body
- Meets weekly with student executive board and university administration to coordinate graduate initiatives, including group/student travel funding, campus advocacy, and PhD policies updates

*Secretary, Webmaster* November 2017 – July 2020  
Women of Whiting School of Engineering Johns Hopkins

- Records meeting minutes and coordinates bimonthly social and professional development events
- Plans annual symposium, featuring ~20 speakers, ~25 schools & employers, and 200+ attendees
- Created website to showcase upcoming events at Hopkins: <https://wow.students.jh.edu>

*Department Representative* November 2017 – May 2019  
Biomedical Engineering PhD Council Johns Hopkins

- Managed off-campus meals during interview weekends with \$2000 budget per event
- Created two networking events for minority student training and recruitment
- Voted on behalf of department at bi-monthly graduate representative meetings

*President* April 2014 – September 2016  
Expediting Access to Standard Education MIT

- Raised \$1000 annually to fund student projects that improve secondary school education in developing countries through plantain sales, soccer tournaments, and other fundraisers
- Coordinated sponsored projects, which included: a java coding course in Nigeria, a hack-a-thon in India, and library restorations in Nigeria and Ghana

## INTERNSHIP EXPERIENCE:

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*Blogger*

October 2018 – March 2019

Broadening Experiences in Scientific Training

National Institutes of Health

- Wrote 6 blog posts for the NIH's Broadening Experiences in Scientific Training blog
- Topics included: science education and outreach, learning new skills, and coping with failure

*Biomedical Equipment Technician*

June – August 2015

Engineering World Health Summer Institute

Nkoaranga Hospital, Arusha, Tanzania

- Repaired 35+ pieces of medical equipment, including an autoclave and oxygen concentrator
- Created Swahili maintenance guides and schedule in collaboration with hospital staff