SHANNON E. ELLIS

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EDUCATION

Year	Degree	Institution	Location	GPA	Discipline
2010-2016	Ph.D.	Johns Hopkins University	Baltimore, MD	NA	Human Genetics
2006-2010	B.S.	King's College	Wilkes-Barre, PA	4.0	Biology & Spanish

RESEARCH EXPERIENCE

Postdoctoral Fellow, 7/2016-present
Johns Hopkins University Bloomberg School of Public Health • Baltimore, MD
Department of Biostatistics
Advisor: Jeffrey T. Leek, Ph.D.

- Developing content and curriculum for a new program to train skilled workers for entry-level jobs in Data Science.
- Building a platform and experiments to better understand how individuals make data analysis decisions and determine how to most effectively teach data analysis
- Using gene expression data from 70,000 human samples and machine learning to predict critical phenotype information.
- Building R packages, tutorials, Shiny apps, and web tools for easy use of data by the larger data science and scientific community.

Graduate Student, 8/2010-6/2016
Johns Hopkins University School of Medicine • Baltimore, MD
Institute of Genetic Medicine
Advisor: Dan E Arking, Ph.D.

- Utilized invaluable post-mortem cortical brain samples to better understand the largely elusive genetic basis of autism.
- Developed a method to guide RNA-Sequencing analysis using eQTLs as a gold standard.
- Analyzed RNA-Sequencing data to study alterations in gene expression in the brains of autistic individuals relative to controls. Identified an upregulation of activated M2 microglia genes in autism brains.
- Identified significant DNA hypermethylation at cytosines outside of the classically-studied CpG context in autism brains utilizing bisulfite sequencing.
- Wrote an R package ('methylarking') for one-step implementation of all methylation analyses.
- Analyzed data using R, Perl, and Python within a UNIX environment.

Undergraduate Researcher, 9/2006-5/2010
King's College • Wilkes-Barre, PA
Department of Biology
Advisor: Jeramia Ory, Ph.D.

- Studied copper's role on the pathogenesis of the opportunistic fungal pathogen, *Cryptococcus neoformans.*
- Identified genes that are differentially expressed at varying copper concentrations between a copper transporter knockout strain (*cuf1*-) and wild type strain (JEC21) of *C. neoformans* to both better understand which genes are involved in copper response and regulation and determine how these genes are altered in the avirulent *cuf1*- strain.
- Found that many genes in the *cuf1*- knockout strain are differentially expressed in low copper conditions relative to wild type and that these genes indicate general metabolic stress in the *cuf1*- strain, suggesting that altering oxidative phosphorylation in *C. neoformans* may help to minimize virulence in pathogenic strains.

COMPUTATIONAL SKILLS

Most Experienced with: **R** and **Perl**
Some Experience with: **Shiny** and **Bash**
Dabbled in: **SQL** and **Python**

PUBLICATIONS

1. **Ellis S.E.**, Collado-Torres L., Jaffe A., Leek J.T. (2017). Improving the value of public RNA-seq expression data by phenotype prediction. doi: https://doi.org/10.1101/145656. ***bioRxiv***. (Under review at ***Nucleic Acids Research***).
2. Andrews S., **Ellis S.E.**, Bakulski K., Sheppard B., Croen L., Hertz-Piccioto I., Newschaffer C., Feinberg A., Arking D.E., and Ladd-Acosta C., and Fallin M. (2017). Cross-tissue integration of genetic and epigenetic data offers insight into autism spectrum disorder. ***Nature Communications***.
3. **Ellis S.E.** and Leek J.T. (2017). How to share data for collaboration. ***The American Statistician***.
4. **Ellis S.E.**, Gupta S., Moes A., West A.B., Arking D.E. (2017). Exaggerated CpH Methylation in the Autism-Affected Brain. ***Molecular Autism***.
5. Collado-Torres L., Nellore A., Kammers K., **Ellis S.E.**, Taub M.A., Hansen K.D., Jaffe A.E., Langmead B., Leek J. (2017). Reproducible RNA-seq analysis using *recount2*. ***Nature Biotechnology.***
6. **Ellis S.E.**, Panitch R., West A.B., Arking D.E. (2016). Transcriptome Analysis of Cortical Tissue Reveals Shared Sets of Down-Regulated Genes in Autism and Schizophrenia. ***Translational Psychiatry.***
7. Huang C, Haritunians T, Okou DT, Cutler DJ, Zwick ME, Taylor KD, Datta LW, Maranville JC, Liu Z, **Ellis S**, Chopra P, Alexander JS, Baldassano RN, Cross RK, Dassopoulos T, Dhere TA, Duerr RH, Hanson JS, Hou JK, Hussain SZ, Isaacs KL, Kachelries KE, Kader H, Kappelman MD, Katz J, Kellermayer R, Kirschner BS, Kuemmerle JF, Kumar A, Kwon JH, Lazarev M, Mannon P, Moulton DE, Osuntokun BO, Patel A, Rioux JD, Rotter JI, Saeed S, Scherl EJ, Silverberg MS, Silverman A, Targan SR, Valentine J, Wang MH, Simpson CL, Bridges SL, Kimberly RP, Rich SS, Cho JH, Di Rienzo A, Kao LW, McGovern DP, Brant SR, and Kugathasan S. (2015). Characterization of Genetic Loci That Affect Susceptibility to Inflammatory Bowel Diseases in African Americans. ***Gastroenterology.***
8. Gupta, S., **Ellis, S.E.**, Ashar, F.N., Moes, A., Bader, J.S., West, A.B., and Arking, D.E. (2014). Transcriptome Analysis Reveals Deregulation of Innate Immune Response Genes and Neuronal Activity-Dependent Genes in Autism. ***Nature Communications***.
9. **Ellis, S.E.**, Gupta, S., Ashar, F.N., Bader, J.S., West, A.B., and Arking, D.E. (2013). RNA-Seq optimization with eQTL gold standards. ***BMC Genomics*** *14*, 892.

TEACHING AND MENTORING EXPERIENCE

Teaching

2018, Spring **Instructor, Health Data Analysis Practicum** • Johns Hopkins University
- Enabling students to enhance their quantitative, scientific reasoning, and functional abilities in statistical analysis using the R statistical language
- Instructing students throughout the seminar course on basic data analysis using public health data sets
- Review code, assist students throughout course assignments, and provide feedback on weekly assignments
- Guide and grade group and individual projects throughout the course

2017, Fall **Teaching Assistant, Public Health Biostatistics** • Johns Hopkins University
- Prepared and instructed two sections weekly (~50 students total)
- Graded and provided feedback on all quizzes, tests, and projects
- Held office hours and answered student emails throughout the semester

2017, Summer **Instructor, Genetics** • Johns Hopkins Center for Talented Youth
- Planned and taught an intensive three-week genetics course to 18 gifted high school students covering Mendelian, molecular, and population genetics
- Used a combination of lectures, activities, laboratories, debates, discussions, and computer simulations to engage and teach students for more than 100 classroom hours
- Assessed and evaluated students' progress throughout the course using both summative and formative assessments
- Wrote individual evaluations for each student

2017, Summer **Invited Speaker** • Maryland Institute College of the Arts

- Prepared lecture to discuss direct-to-consumer ancestry results with college-age non-science-major students
- Discussed both what you can and cannot learn from ancestry testing as well as the differences between race and ethnicity

2015, Fall **Guest Lecturer**, **Intro to Computational Genetics** • Johns Hopkins University (SOM)

- Instructed class of graduate students on data analysis techniques and pitfalls of RNA-Sequencing data analysis.
- Prepared two lectures and accompanying exercises for in-class instruction as well as take-home exercises to both assess comprehension and provide feedback to students.
- Instructors: Dan E. Arking and Dimitrios Avramopolous

2012—2014 **Tutor, Comprehensive Exam Preparation** • Johns Hopkins University (SOM)

- Reviewed linkage and association studies for second year graduate students.
- Held mock exam practice sessions for students as they prepared for their oral comprehensive exams.

2013, Spring **Teaching Assistant, Advanced Topics in Human Genetics** • Johns Hopkins (SOM)

- Teaching assistant for 12 first year graduate students and three pediatric genetics fellows.
- Facilitated and guided discussion-based classes, and met with students to discuss the literature and help prepare in-class presentations.
- Wrote, administered, and graded the midterm exam.

2007—2010 **Tutor in Genetics, Biochemistry, and General Chemistry I & II** • King's College

- Individually tutored more than 45 undergraduate students.
- Reviewed lecture material, answered questions on assigned problem sets, and prepared and administered preparatory quizzes and exams.

Mentoring

2016, Winter Augusto Ramirez, Undergraduate Student
2016, Winter Elizabeth Vincent, Graduate Student
2015-2016 Rebecca Panitch, Undergraduate Student
2014, Winter Heather Wick, Graduate Student
2014, Summer Edward Pang, Undergraduate Student
2013, Summer James Miller, Undergraduate Student

Professional Development

2017—present Participant, Johns Hopkins Future Faculty Teaching Academy Certificate Program
2017, Spring Participant, Johns Hopkins Teaching Institute

- An intenstive workshop in pedagogy focused on enhancing instruction in higher education
- Topics covered unclude: Teaching as Scholarship, Inclusive Classrooms, Active Learning, Planning a Course, Assessment, and Evaluation

CONFERENCES

Scientific Meetings Attended

2017 Graybill Conference in Statistical Genomics and Genetics
2017 rOpenSci Unconference
2017 BIRS Statistical and Computational Challenges in Large Scale Molecular Biology
2017 Statistical and Algorithmic Challenges in Microbiome Data Analysis
2010, 2012—2015 American Society for Human Genetics
2013—2014 Society for Neuroscience
2009—2010 American Society for Microbiology

Invited Talks

1. **Ellis, S.E.** (Oct 11, 2017). Improving the value of public data with *recount2* and phenotype prediction. Genomics and Bioinformatics Symposium.
2. **Ellis, S.E.** (June 5-7, 2017). *In silico* phenotyping to improve the usefulness of public data. Graybill Conference in Statistical Genomics and Genetics.

2. **Ellis, S.E.** (March 26-31, 2017). *In silico* phenotyping to improve the usefulness of public data. BIRS Statistical and Computational Challenges in Large Scale Molecular Biology.
3. **Ellis, S.E.** (Feb 16-17, 2017). Increasing the value of public data with *in-silico* phenotyping. Statistical and Algorithmic Challenges in Microbiome Data Analysis.

Poster Presentations
1. **Ellis, S.E.**, Gupta S., Moes A, Absher D., West A.B. & Arking D.E. (Oct. 6-10, 2015). No Evidence That Differences In Cortical DNA Methylation Contribute to Autism. American Society for Human Genetics.
2. **Ellis, S.E.**, Gupta, S., Moes, A., West, A.B., and Arking, D.E. (Oct. 18-22, 2014). Assessing the role of methylation in autism brains. American Society for Human Genetics.
3. **Ellis, S.E.**, Gupta, S., Ashar, F.N., Bader, J.S., West, A.B., and Arking, D.E. (Oct. 22-26, 2013). RNA-Seq optimization with eQTL gold standards. American Society for Human Genetics.
4. **Ellis, S.E.**, Arking, D.E., Iacono, D., Pletnikova, O., Rudow, G., Talbot, C., O'Brien, R., Resnick, S. and Troncoso, J.C, (Nov. 9-13, 2013). Understanding the Transcriptome of Asymptomatic Alzheimer's Disease. Society for Neuroscience.
5. **Ellis, S.E.**, Doering, T.L., and Ory, J.J. (May 23-27, 2010). Microarray Analysis of a *cuf1* Strain of *Cryptococcus neoformans* Suggests Cuf1p is Involved in Both Repressor and Enhancer Activities. American Society for Microbiology.

ORGANIZATIONAL ACTIVITIES

Editorial Experience

2017	Nature Biotechnology
2017	European Journal of Human Genetics
2017	PeerJ

Volunteering

2016—present	Volunteer, Science Outside the Lines
2015—present	Volunteer, Icing Smiles

Leadership Experience

2013—2016	Institute of Genetic Medicine Human Genetics Graduate Student Representative
2013—2016	Student Leader, Barton Childs Lecture Planning Committee
2011—2015	Committee Leader, Human Genetics Graduate Program New Student Recruitment
2014, Spring	Student Leader, McKusick Lecture Planning Committee

Professional Societies

2010—present	Member, The American Society of Human Genetics
2017	Abstract Reviewer, The American Society of Human Genetics
2015-2016	DNA Day Essay Judge, The American Society of Human Genetics

HONORS AND AWARDS

2017	Johns Hopkins Center for Talented Youth Teaching Award
2006—2010	Presidential Scholarship (a full academic scholarship to King's College, Wilkes-Barre, PA)
2006—2010	Mendenhall-Tyson Scholarship
2010	Paul D. Laurence Best in Science Award
2010	Regina Award for Biology
2010	S. Idris Ley Memorial Award for the Highest Academic Achievement
2010	Josephine T. Moran Foreign Language Award
2009	Paul D. Laurence Best in Science Award
2009	American Society for Microbiology Student Travel Grant Award, 109th General Meeting
2009	American Society for Microbiology Undergraduate Research Fellowship
2008	National Science Foundation Undergraduate Research Fellowship