

Derek E Kelly

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EDUCATION

University of Pennsylvania

Ph.D. in Genomics and Computational Biology
Advisor Dr. Sarah Tishkoff

April 2022 (anticipated)

University of Missouri, Columbia

B.S. in Anthropology and Biology
Minors in Mathematics and Art
Graduated Magna Cum Laude
Member Phi Beta Kappa

May 2013

TECHNICAL SKILLS

Programming Languages	R, Bash, Python, Perl, MATLAB
Genomic Analysis	RNA-seq, scRNA-seq, CITE-seq, DNase-seq, ATAC-seq, ChIP-seq
Genetic Analysis	Variant Calling (SNP, Indel, SV), GWAS and molecular QTL mapping, Admixture, Relatedness, Selection
Statistical Analysis	Regression (Linear, Generalized, Regularized, Mixed Effect), Survival Analysis, Machine Learning (SVM, HMM, Clustering, Random Forest, Neural Networks), Bayesian Models and Inference
Document Processing	MS Office (Word, PowerPoint, Excel), Adobe Illustrator, LaTeX

ANALYTICAL SKILLS

- Digesting primary literature from diverse technical and scientific fields
- Evaluating the impact of technical and biological variables in high dimensional data
- Building and troubleshooting bioinformatic pipelines that process large, complex datasets
- Assessing causality and reverse-causality between genetics, molecular processes, ancestry, and the environment
- Breaking down complex topics and communicating at appropriate levels of detail

PUBLICATIONS

1. D. E. Kelly, S. Ramdas, R. Ma, R. A. Rawlings-Goss, G. R. Grant, A. Ranciaro, J. B. Hirbo, W. Beggs, M. Yeager, S. Chanock, T. B. Nyambo, S. A. Omar, D. W. Meskel, G. Belay, H. Li, C. D. Brown, S. A. Tishkoff, The Genetic and Evolutionary Basis of Gene Expression Variation in East Africans. *bioRxiv*, eprint: <https://www.biorxiv.org/content/early/2022/02/16/2022.02.16.480765.full.pdf> (2022).

2. S. Fan, D. E. Kelly, M. H. Beltrame, M. E. B. Hansen, S. Mallick, A. Ranciaro, J. Hirbo, S. Thompson, W. Beggs, T. Nyambo, S. A. Omar, D. W. Meskel, G. Belay, A. Froment, N. Patterson, D. Reich, S. A. Tishkoff, African evolutionary history inferred from whole genome sequence data of 44 indigenous African populations. *Genome Biology* **20**, 1–14 (Dec. 2019).
3. N. G. Crawford, D. E. Kelly, M. E. B. Hansen, M. H. Beltrame, S. Fan, S. L. Bowman, E. Jewett, A. Ranciaro, S. Thompson, Y. Lo, S. P. Pfeifer, J. D. Jensen, M. C. Campbell, W. Beggs, F. Hormozdiari, S. W. Mpoloka, G. G. Mokone, T. Nyambo, D. W. Meskel, G. Belay, J. Haut, NISC Comparative Sequencing Program, H. Rothschild, L. Zon, Y. Zhou, M. A. Kovacs, M. Xu, T. Zhang, K. Bishop, J. Sinclair, C. Rivas, E. Elliot, J. Choi, S. A. Li, B. Hicks, S. Burgess, C. Abnet, D. E. Watkins-Chow, E. Oceana, Y. S. Song, E. Eskin, K. M. Brown, M. S. Marks, S. K. Loftus, W. J. Pavan, M. Yeager, S. Chanock, S. Tishkoff, Loci associated with skin pigmentation identified in African populations. *Science* **358** (Nov. 2017).
4. C. Jia, Y. Hu, D. Kelly, J. Kim, M. Li, N. R. Zhang, Accounting for technical noise in differential expression analysis of single-cell RNA sequencing data. *Nucleic Acids Research* **45**, 10978–10988 (Nov. 2017).
5. D. E. Kelly, M. E. B. Hansen, S. A. Tishkoff, Global variation in gene expression and the value of diverse sampling. *Current Opinion in Systems Biology* **1**, 102–108 (Feb. 2017).
6. D. Kelly, A. Vatsa, W. Mayham, T. Kazic, Extracting complex lesion phenotypes in Zea mays. *Machine Vision and Applications* **27**, 145–156 (Jan. 2016).
7. D. Kelly, A. Vatsa, W. Mayham, L. Ng, A. Thompson, T. Kazic, An opinion on imaging challenges in phenotyping field crops. *Machine Vision and Applications* **27**, 681–694 (July 2016).

INVITED PRESENTATIONS

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| The genetics of skin pigmentation in Africa
<i>Hands-On, Minds-On Professional Development for Local Teachers</i> | <i>January 2019</i> |
| Novel loci underlying Human skin pigmentation variation in Africa
<i>Skin Biology and Disease Resource-Based Center Symposium</i> | <i>September 2018</i> |
| Understanding the genetic basis of human adaptation in Africa through integrative genomics
<i>Penn GCB & IBI Retreat</i> | <i>May 2018</i> |

TEACHING EXPERIENCE

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| TA BIOL 522 Human Evolutionary Genomics | <i>Spring 2018</i> |
| <ul style="list-style-type: none"> • Aided in developing a reading list covering human demographic history, archaic hominins and ancient DNA, genetic variation, comparative genomics, human adaptation, gene regulation and epigenetics, and the human microbiome. Guided discussion of the literature and aided students in developing a course presentation. | |
| Tutor STAT 510 Probability | <i>2017 - 2018</i> |
| <ul style="list-style-type: none"> • Tutored students in topics including: discrete and continuous random variables and their distributions; expectation and conditional expectation; moments and moment generating functions; functions and transformations of random variables; law of large numbers and the central limit theorem; point estimation: sufficiency, maximum likelihood, minimum variance, and confidence intervals | |

RELEVANT COURSES

STAT 510 Probability	A-	STAT 512 Mathematical Statistics	A
STAT 542 Bayesian Methods and Computation	A	STAT 571 Modern Data Mining	A
CIS 520 Machine Learning	A-	CIS 545 Big Data Analytics	A-